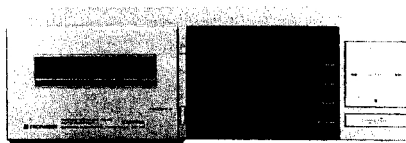


Service Manual

**CIRCUIT & MECHANISM
DESCRIPTIONS
REPAIR & ADJUSTMENTS**



**ORDER NO.
ARP-237-0**

STEREO CASSETTE TAPE DECK

CT-X9

MODEL CT-X9 COMES IN FOUR VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	AC120V only	U.S.A. model
HE	AC220V and 240V (Switchable)	Europe model
HB	AC220V and 240V (Switchable)	United Kingdom model
D	AC120V, 220V and 240V (Switchable)	General export model

- This service manual is applicable to the KU type. When repairing the HE, HB and D types, please see page 77.
- For the mechanism description, please refer to the supplement of model CT-7R service manual <ARP-001>.
- Ce manuel d'instruction se réfère au mode de réglage, en français.
- Este manual de servicio trata del método de ajuste escrito en español.

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1. SPECIFICATIONS

System	Compact cassette, 2-channel stereo
Heads	"Ribbon Sendust" recording/playback combination head x 1, Erasing head x 2
Motor	DC servo D.D. motor x 1 (For driving the capstan) Brushless D.D. motor x 2 (For driving the reel)
Wow and Flutter	No more than 0.04% (WRMS)
Fast Winding Time	Approximately 90 seconds (C-60 tape)
Frequency Response	
-20 dB recording:	
Normal tape	30 to 16,000 Hz $\pm$ 3 dB (25 to 17,000 Hz)
Chrome tape	30 to 17,000 Hz $\pm$ 3 dB (25 to 18,000 Hz)
Metal tape	30 to 17,500 Hz $\pm$ 3 dB (25 to 18,500 Hz)
0 dB recording:	
Normal tape	30 to 9,000 Hz
Chrome tape	30 to 10,000 Hz
Metal tape	30 to 15,000 Hz
Signal-to-Noise Ratio	
Dolby NR OFF	More than 58 dB
Noise Reduction Effect	
Dolby B-type NR ON	More than 10 dB (at 5 kHz)
Dolby C-type NR ON	More than 19 dB (at 5 kHz)
Harmonic Distortion	No more than 0.8% (0 dB)
Input (Sensitivity/Maximum allowable input/Impedance)	
LINE (INPUT)	50 mV/25 V/50 k Ω , Pin jacks
Output (Maximum level/Load impedance)	
LINE (OUTPUT) x 2	450 mV/50 k Ω

Subfunctions

- 3 Motor direct-drive mechanism
- Playback auto reverse, Recording auto reverse
- Auto repeat function
- Music search function with LED indicator lamp
- Index scan function with LED indicator lamp
- Dolby NR system (B type/C type/OFF) with LED indicator lamp
- One-touch recording function
- REC muting function with LED indicator lamp
- Auto tape selector (NORM/CrO₂/METAL)
- Timer stand-by function
- One-touch auto function
- 4-digit tape counter
- Cassette compartment illumination

Miscellaneous

Power Requirements	AC 120 V, 60 Hz
Power Consumption	42 watts
Dimensions	320 (W) x 99.5 (H) x 213.3 (D) mm 12-10/16 (W) x 3-15/16 (H) x 8-6/16 (D) in
Weight (without package)	4.8 kg (10 lb 9 oz)

Furnished Parts

Operating instructions	1
Connection cord	2

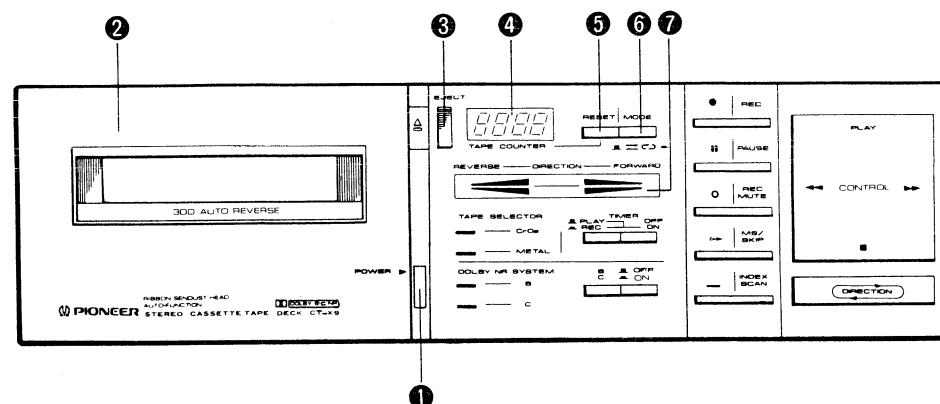
NOTE:

Specifications and the design subject to possible modifications without notice due to improvements.

NOTES:

1. Reference Recording Level: -7 dBv level at line out (160 nwb/m magnetic level = Philips cassette reference level)
2. Reference Signal: 333 Hz
3. Wow & Flutter: • JIS [3 kHz, with acoustic compensation (weighted), rms value]
4. Frequency Response: • Measured at -20 dB level, DOLBY NR OFF, level deviation is $\pm$ 6 dB without indication.
5. Signal to Noise Ratio: • Measured at the third harmonic distortion 3% level, weighted.
6. Sensitivity: Input level (mV) required for reference recording level with input (REC) controls set to maximum.
7. Maximum Allowable Input: While decreasing settings of input (REC) level controls and increasing level at input jacks, this is the maximum input level (mV) at the point where recording amplifier output waveform becomes clipped.
8. Reference Output Level: -7 dBv level at line out during playback

2. FRONT PANEL FACILITIES



1 POWER SWITCH

When this switch is depressed, power is turned ON, and when it is depressed again, power is turned OFF. When you push the power switch, be sure the timer switch (TIMER) is set to the OFF position.

- When the power switch is turned ON without a cassette tape inserted, the tape indicator METAL will light.
- After turning the power switch ON, the muting circuit will function for about four seconds before the tape deck operates.

2 CASSETTE HOLDER

The cassette holder opens when the eject button (EJECT ▲) is depressed. Insert the cassette with the exposed tape side facing down. The cassette holder cannot be opened while the tape is playing.

3 EJECT BUTTON (EJECT ▲)

When the button is depressed, the cassette holder opens. Do not depress this button while the tape is playing or if the tape is stopped temporarily during recording or playback. In these cases, the cassette holder will not open even if the eject button is depressed.

4 TAPE COUNTER

The numbers change as the tape is playing. Tape position is indicated with a four-column digital counter.

5 RESET BUTTON

Depressing this button resets the tape counter to "0000". Depress this button before recording or playback to reset the counter to "0000". If you make a memo of the tape contents and corresponding tape counter numbers during recording and playback, you will have an index of the programs on the tape enabling you to conveniently find any desired program on the tape.

6 MODE SWITCH

This switch selects the tape mode.

➡ (■):

When this button is in the OFF position, the tape will be transported in one direction only. When the tape comes to the end of its transport, tape transport will be automatically stopped.

↺ (■):

When the button is in the ON position, tape transport will be in the automatic reverse mode. When one side of the tape comes to its end, tape direction will be reversed, playing the other side. In this way, you can play both A and B sides up to four times automatically. After the fourth full play, the tape transport will be automatically stopped. If the pause switch (PAUSE) is depressed in the middle of play, and then depressed again, tape play will recommence for another four full plays.

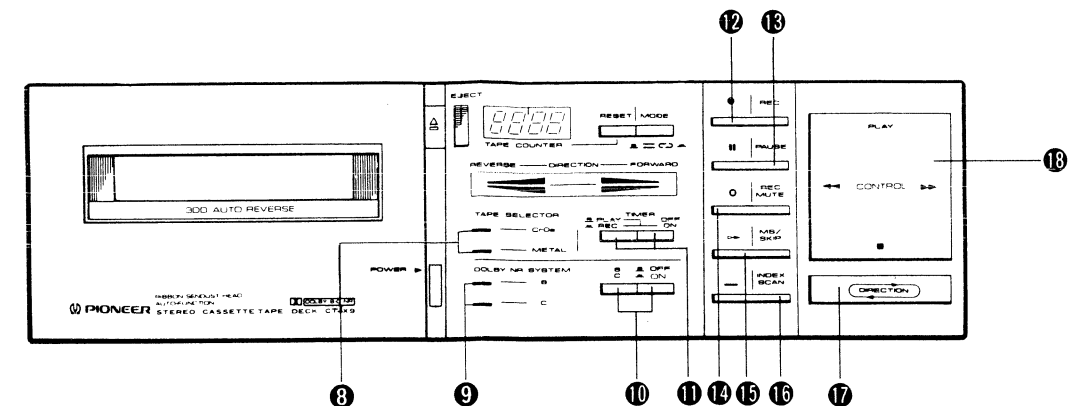
When recording, begin from the forward mode. In this way, when the tape comes to the end of the first side, tape direction will be automatically reversed to record the second side. If recording is begun from the reverse mode, the tape will not automatically reverse itself, so be careful to note the position of the direction switch and the position of the cassette when inserting it into the unit.

7 DIRECTION INDICATOR

This indicates the direction of tape transport. When the tape travels from the left to the right, it is said to be in the forward mode. In this case, the FORWARD (➡) indicator will light.

When the tape travels from the right to the left, it is said to be in the reverse mode. The REVERSE (↺) indicator will light.

The tape transport direction is changed by depressing the DIRECTION switch.



8 TAPE SELECTOR

This mechanism uses the sensor holes on the cassette to detect the type of tape being used. It then automatically adjusts the proper recording bias and equalization for the tape. The type of tape is then shown on the tape indicator. Refer to page 8 for the different types of cassette tapes and their hole positions.

CrO₂: This indicator lights when CrO₂ tapes are used.

METAL: This indicator lights when metal tapes are used.

NOTE:

- When normal tapes are used, the indicator does not light.
- When using metal tapes without sensor holes, the tape selector will be set on the CrO₂ position. In this case, optimum recording and erasure may not be possible. We thus recommend that you use metal tapes with sensor holes. Pre-recorded metal tapes can be played as is on this unit.

9 DOLBY INDICATOR

This indicates whether the Dolby NR (Noise Reduction) type used is the B type or C type. When the Dolby NR switch is pushed to the ON position (■), one of these indicators will light, showing that the Dolby circuit is in operation.

10 DOLBY NR SWITCH

When the Dolby NR (Noise Reduction) system is used to record a tape, or when playing back a tape recorded on Dolby, the switch on the right is pushed to the ON position (■). There are two types of Dolby NR System, B-type and C-type. Use the switch on the left to choose the type. To choose B-type, the switch should be in OFF position (B ■). To choose C-type, the switch should be in ON position (C ■).

When playing a tape which has not been recorded on Dolby, set the switch on the right so that it is in OFF position (■).

11 TIMER SWITCH

This switch is used to automatically begin recording or playback at a selected time when you are away from the unit.

For unattended recording

Depress both the switches on the right and the one on the left.

For wake-up playback

Depress the switch on the right to the ON position (■), and depress the switch on the left to the OFF position (PLAY ■).

When not using the timer.

Depress the right switch to the OFF position (■). Normally this switch is left in the OFF position. When the POWER switch is turned "ON" with the unit in the "REC" or "PLAY" mode, recording or playback will automatically begin.

12 RECORDING SWITCH

This switch is depressed to record a tape. The recording indicator (●) will light. The switch cannot be placed in the ON position if the accidental erasure prevention tabs on the cassette have been broken out, or if no cassette is in the unit.

13 PAUSE SWITCH

Depress this switch to stop the tape travel temporarily during recording or playback. Depress this switch again to allow the tape to continue to travel. When this switch is depressed to the ON position, the OPERATION MODE indicator (PAUSE ■) will be illuminated.

The tape does not stop during fast forward or rewind operations even when the PAUSE switch is depressed.

14 REC MUTE SWITCH

Depressing this switch during recording makes it possible to create an unrecorded blank on the cassette tape only for the time during which the switch is kept depressed. (This switch is not locked.) When this switch is depressed, the REC MUTE indicator (●) will be illuminated.

15 MUSIC SEARCH/SKIP SWITCH (MS/SKIP)

Depress this switch and then the ►► (Fast Forward) or ◀◀ (Rewind) switch. The ►► indicator will light. While on fast forward or rewind, the unit will automatically detect non-recorded intervals of 4 seconds or longer, and switch automatically to playback mode. This function is called Music Search.

While in the playback mode, if the non-recorded interval exceeds 8 seconds, the unit will revert automatically to the previously selected fast forward or rewind mode and search for the next program on the tape, then switching again automatically to the playback mode. This function is called SKIP function. To release the unit from these functions, depress the MS/SKIP switch once again.

16 INDEX SCAN SWITCH

Use this function when you want to find a particular selection on a music tape. When the switch is depressed, the ■ indicator will light, and the selected transport mode (fast forward or reverse) will operate and the unit will search for the beginning of the next selection on the tape. It will play the beginning of the selection for approximately 7 seconds, and then switch again to the fast forward or rewind function, searching for the next selection. When it comes to the selection you want to hear, depress the PLAY switch.

17 DIRECTION SWITCH (DIRECTION)

This switch is used to select the direction of tape transport. If depressed when the unit is in the forward mode, it will switch to reverse play. If depressed when the unit is in the reverse play mode, it will switch to the forward play mode. The direction indicators will light to indicate the direction of tape transport.

- If the switch is depressed when the unit is in the playback pause mode, the tape transport direction will still be changed to the opposite direction.
- If the switch is depressed during tape recording, the tape will reverse its direction.

18 FUNCTION SWITCHES

PLAY:

Depress this switch to playback a tape.

◀◀ (Rewind):

Depress this switch to rewind the tape quickly right to left. It is also depressed when using Music Search function.

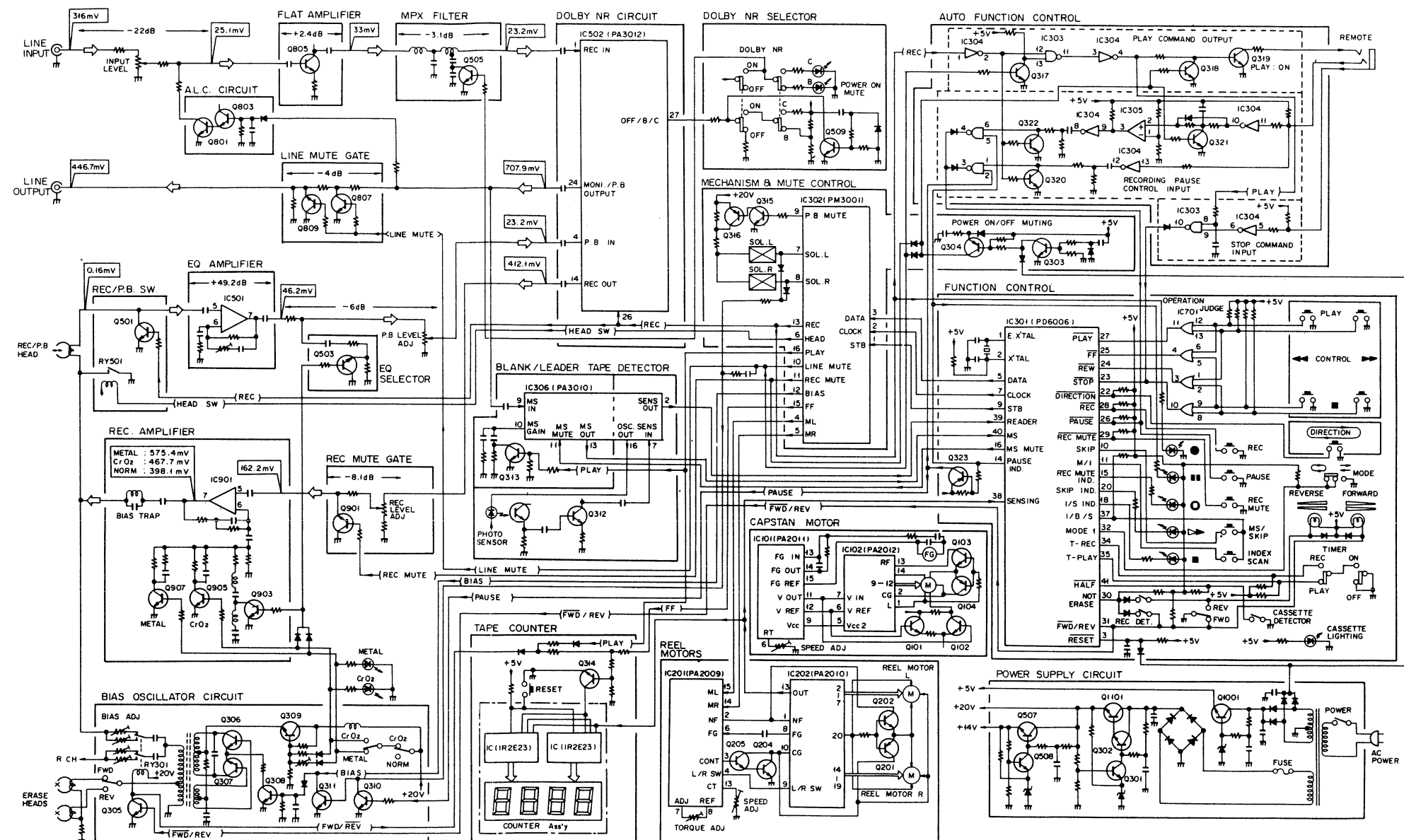
►► (Fast Forward):

Depress this switch to wind the tape quickly from left to right. It is also depressed when using Music Search function.

■ (Stop):

Depress this switch to stop tape transport.

3. BLOCK DIAGRAM



4. CIRCUIT DESCRIPTIONS

4.1 CONTROL CIRCUIT

The CT-X9 tape transport mechanism is set to the different modes by microcomputer control of two solenoid plungers and by utilizing the drive power of the capstan motor. The basic operations for these mechanisms are described in the CT-7R Service Manual (ARP-001-0).

In the CT-X9, operation is controlled by three custom ICs (PD6006, PM3001, and PA3010). The 4-bit CPU PD6006 controls the tape transport mechanism, audio signal circuit switching, and the operation involved in each function. PM3001 consists of a circuit which converts PD6006 output control signals (16-bit serial data) into the format necessary for actual operational control, and a current amplifier circuit for driving external elements. PA3010 includes a circuit for detecting unrecorded blank portions of tape required for

MS/SKIP and INDEX SCAN operations, and a circuit for detecting the cassette leader tape for quick reversing operation.

When the mode KEY is switched on, the 16-bit serial data shown in Fig. 4-2 appears at pin 5 of PD6006, and a clock pulse output appears at pin 7 (data and clock outputs are generated each time a key is switched on, and also by each relevant timing). The 16-bit serial data is applied to pin 3 of the extended IC PM3001, and is read by the PM3001 shift register at the rising edge of the clock pulse applied to pin 2. Upon completion of the data reading, an STB (strobe) pulse is applied to pin 1, resulting in the appearance of control output signals at the relevant output pins of PM3001 according to the key input. (See Fig. 4-4).

POWER is ON

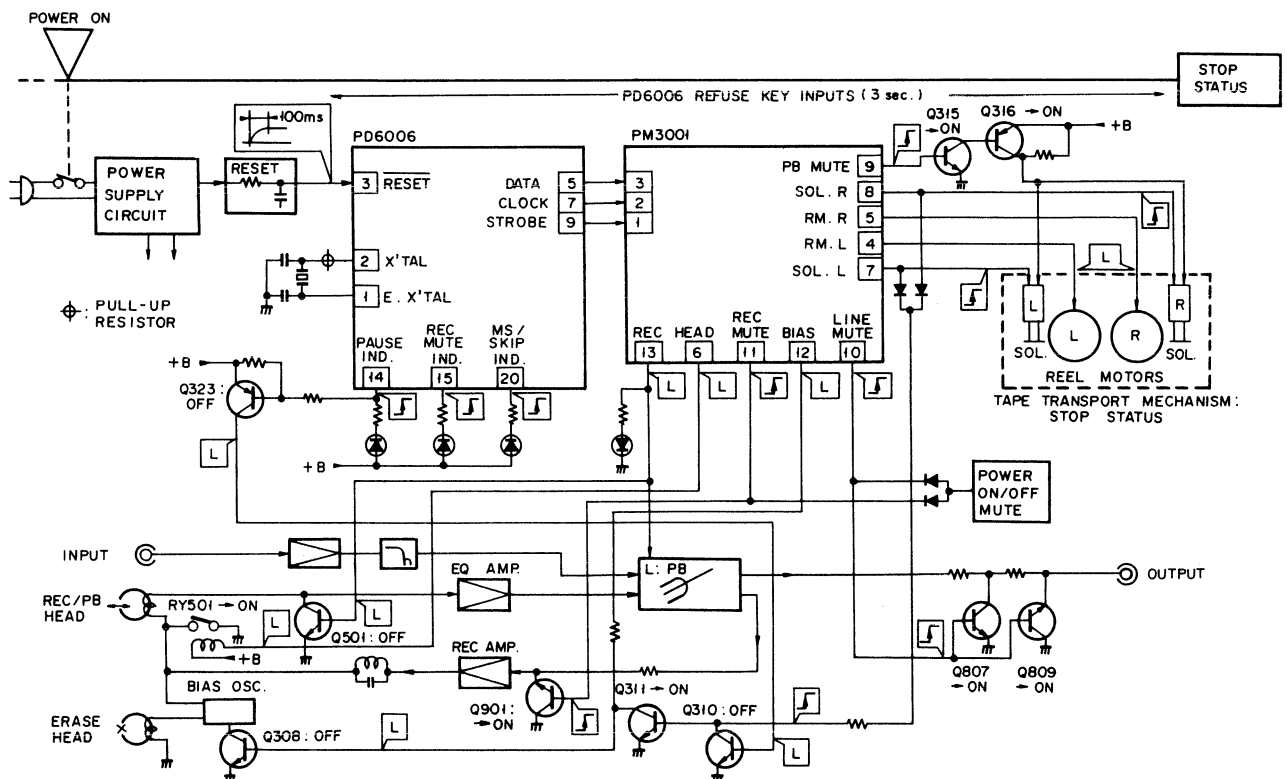


Fig. 4-1 Power is ON

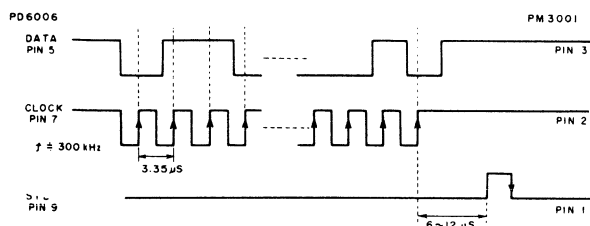


Fig. 4-2 PD6006 Data output

PD6006 Key Input Circuit

The play, fast forward, rewind, and stop modes in the CT-X9 are all switched by the same one CONTROL button. The CONTROL button includes four separate non-lock type switches, one under each corner of the button. The selected mode is detected by a combination of two switches being turned on, depending on what part of the CONTROL button is pressed. This detection signal is judged by OR gate (used as negative logic AND gate) with the resultant key input being applied to PD6006. (See Fig 4-3).

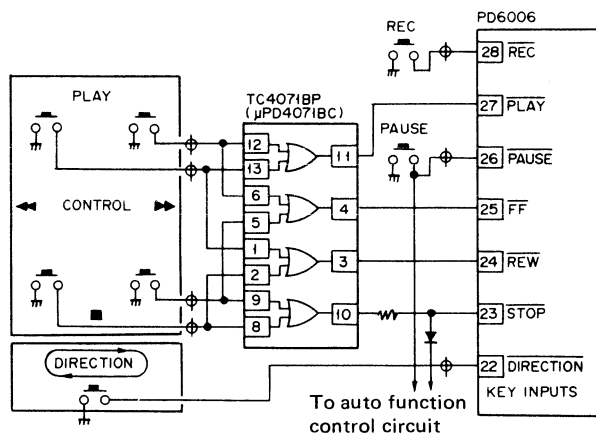


Fig. 4-3 PD6006 key input circuit

PM3001 OUTPUT STATE BY MODE

Pin No.	MODE FUNCTION	STOP		FF		REW		PLAY		REC/PLAY		STOP PAUSE		PLAY PAUSE		REC/PLAY PAUSE	
		FWD	REV	FWD	REV	FWD	REV	FWD	REV	FWD	REV	FWD	REV	FWD	REV	FWD	REV
4	RM. L	L (OFF)		L		H		L	M	L	M	L		L		L	
5	RM. R	L (OFF)		H		L		M	L	M	L	L		L		L	
6	HEAD SW	L (P.B. MODE)		L		L		L		H		L		L		H	
7	SOL. L	H (OFF)	H	L	H	L		L		L		H	H	L	H	L	
8	SOL. R	H (OFF)	L	H	L	H		L		L		H	L	H	L	H	
9	P.B. MUTE	H (ON)		H		H		L		L		H		H		H	
10	LINE MUTE	H (ON)		H		H		L		L		H		H		L	
11	REC MUTE	H (ON)		H		H		H		L		H		H		H	
12	BIAS	L (OFF)		L		L		L		H		L		L		L	
13	REC	L (OFF)		L		L		L		H		L		L		H	
14	REW IND	L (OFF)		L		H		L		L		L		L		L	
15	FF IND	L (OFF)		H		L		L		L		L		L		L	
16	PLAY IND	L (OFF)		L		L		H		H		L		L		L	
PD 6006																	
14	PAUSE IND	H (OFF)		H		H		H		H		L		L		L	

Fig. 4-4 PM3001 Output state by mode

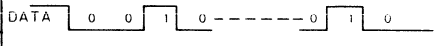
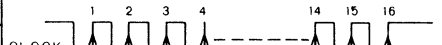
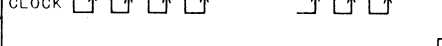
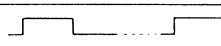
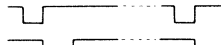
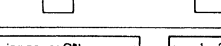
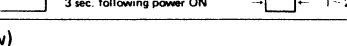
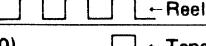
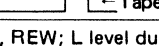
Pin No.	Symbol	I/O Status	Description	Applicable Model
				CT-X9
1	Extal	—	Used by internal quartz oscillator  Pin 2 – GND	○
2	Xtal	—	External circuit terminal $f = 3.58\text{MHz}$	○
3	RESET	IN	CPU reset input (effective low, normally high)	○
4	M-STOP	IN	Memory STOP input (effective low)	X
5	DATA	OUT	DATA output to PM3001 	Serial output to PM3001
6		NC		
7	CLOCK	OUT	CLOCK output to PM3001 	
8		NC		
9	STB	OUT	STB output to PM3001 	○
10	SKIP	OUT	SKIP key scan output 	KEY SCAN output
11	M/I	OUT	MUSIC REPEAT, INDEX SCAN key scan output 	
12	B/S	OUT	BLANK SEARCH key scan output 	
13	AUTO BLE	OUT	AUTO BLE start output 	X
14	PAUSE IND	OUT	PAUSE indicator output (effective low)	Indicator output
15	REC MUTE IND	OUT	REC MUTE indicator output (effective low)	
16	MS MUTE	OUT	MS MUTE output, PA3010 MS signal MUTE output (low level while reel motor turning during blank detector operation)	○
17	M/R IND	OUT	MUSIC REPEAT indicator output (effective low)	Indicator output
18	I/S IND	OUT	INDEX SCAN indicator output (effective low)	
19	B/S IND	OUT	BLANK SEARCH indicator output (effective low)	
20	SKIP IND	OUT	SKIP indicator output (effective low)	
21	GND	NC	GND	○
22	DIRECTION	IN	DIR (direction) key input	Mode Key input
23	STOP	IN	STOP key input	
24	REW	IN	REW key input	
25	FF	IN	FF key input	
26	PAUSE	IN	Pause key input	
27	PLAY	IN	PLAY key input	
28	REC	IN	REC/PLAY key input	
29	REC MUT	IN	REC MUTE key input	
30	REC Sensor	IN	REC sensor switch input (enabled low, disabled high)	Mechanism SW input
31	F-R SW	IN	FWD/REV sensor switch input (FWD: L; REV: H)	
32	MODE I	IN	Mode selector switch input	Mode selector SW input
33	MODE II	IN		X
34	T-REC	IN	Timer REC switch input	Timer mode SW input
35	T-PLAY	IN	Timer PLAY switch input	
36	M.REPEAT	IN	MUSIC REPEAT key input	Key matrix input
37	I/B/S	IN	INDEX SCAN, BLANK SEARCH, SKIP key input	
38	SENSING	IN	Sensing pulse input (from PA2010 pin)  ← Reel turning	○
39	LEADER	IN	Tape leader pulse detector input (from pin 2, PA3010)  ← Tape leader detected	○
40	MS	IN	Blank signal input (H level between selection in PLAY, FF, REW; L level during selection; H level all other times)	○
41	HALF SW	IN	Cassette loading switch input (Loaded: L; Unloaded: H)	○
42	VDD	NC	+5V power source	○

Fig. 4-5 PD6006 Pin description

STOP to PLAYBACK

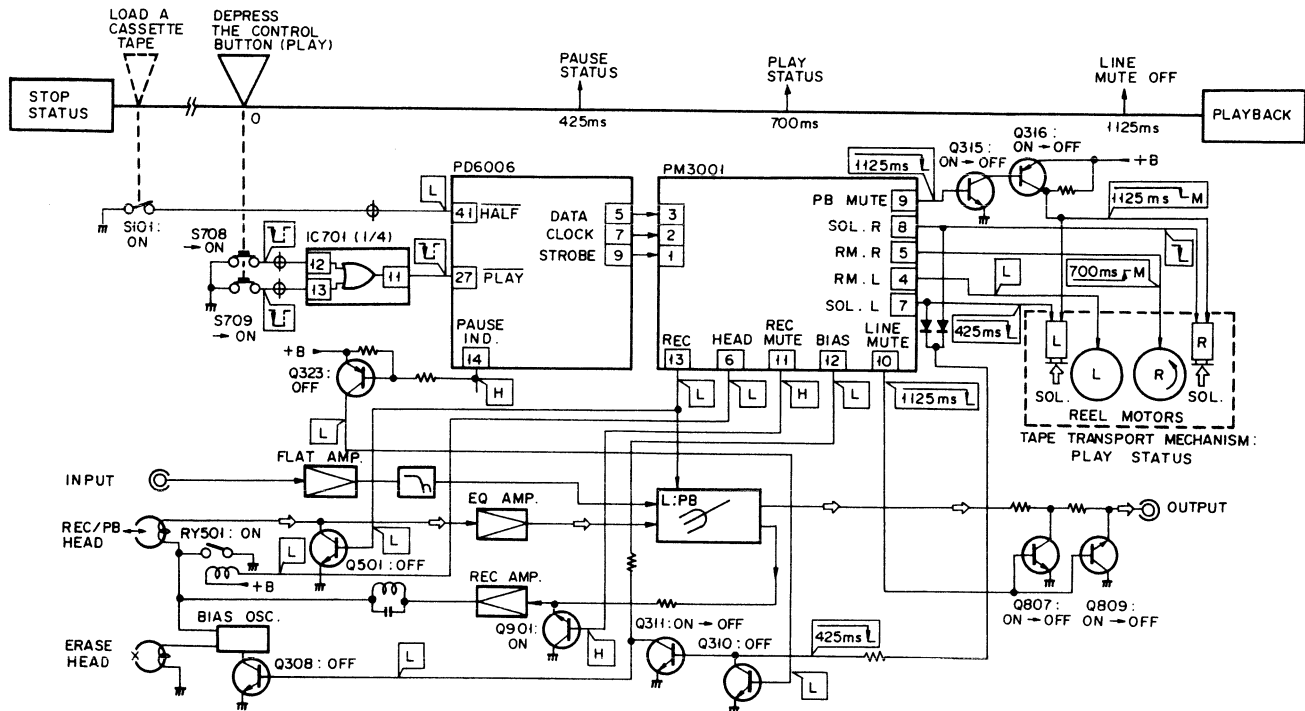


Fig. 4-6 Stop to playback

STOP to RECORDING

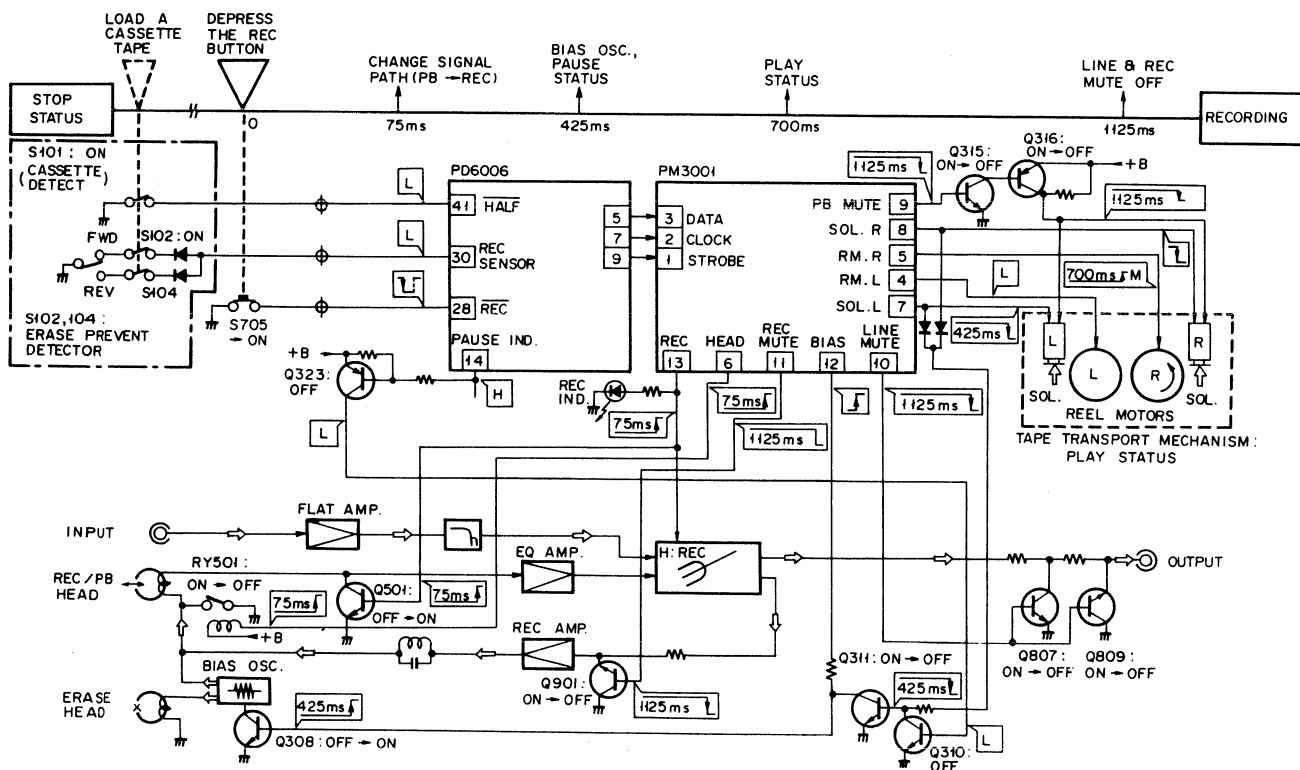


Fig. 4-7 Stop to recording

RECORDING to REC PAUSE

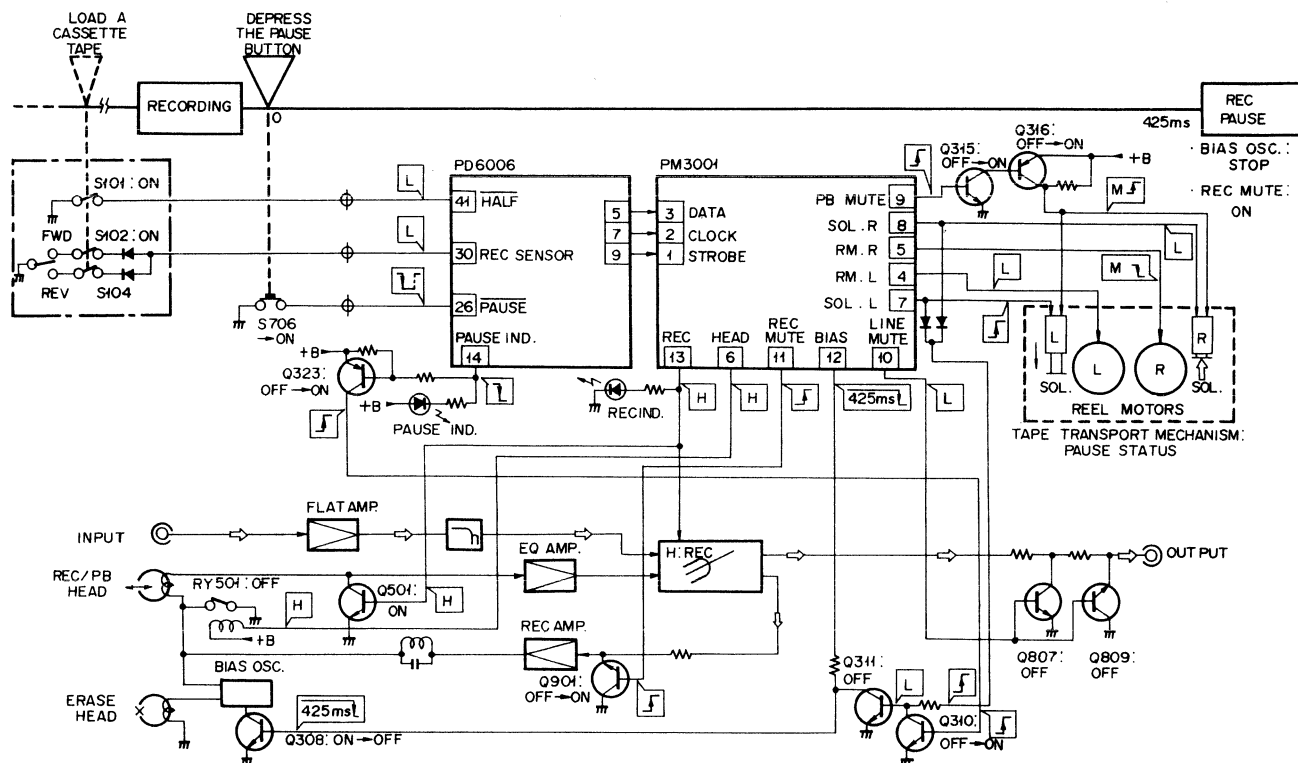


Fig. 4-8 Recording to REC pause

STOP to FF

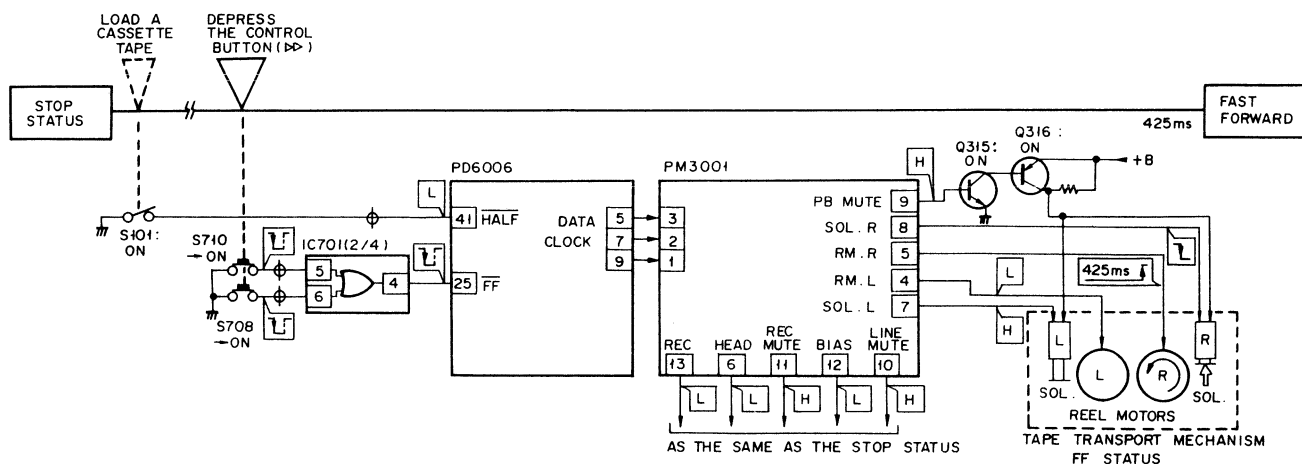


Fig. 4-9 Stop to FF

STOP to REW

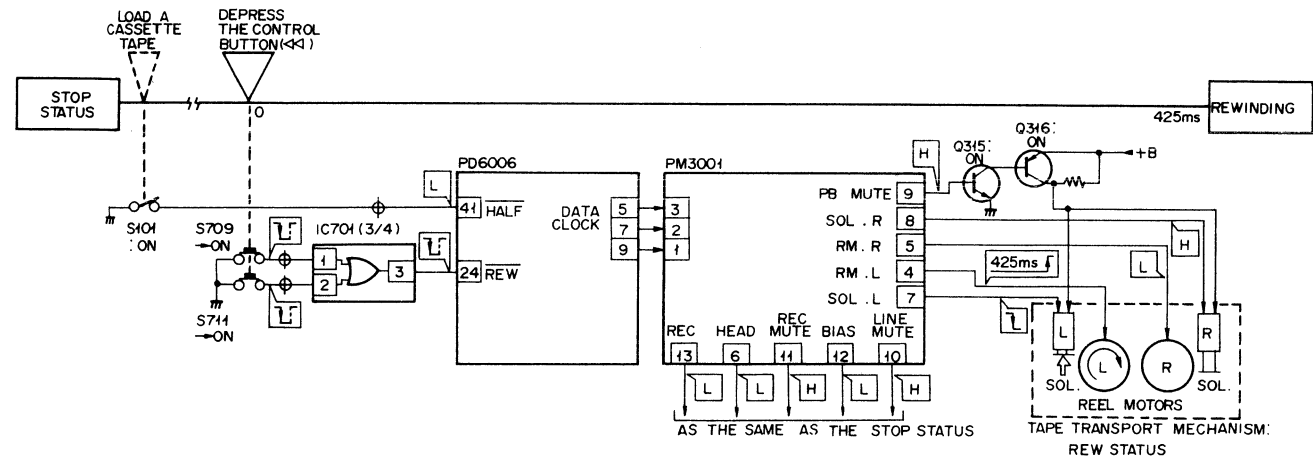
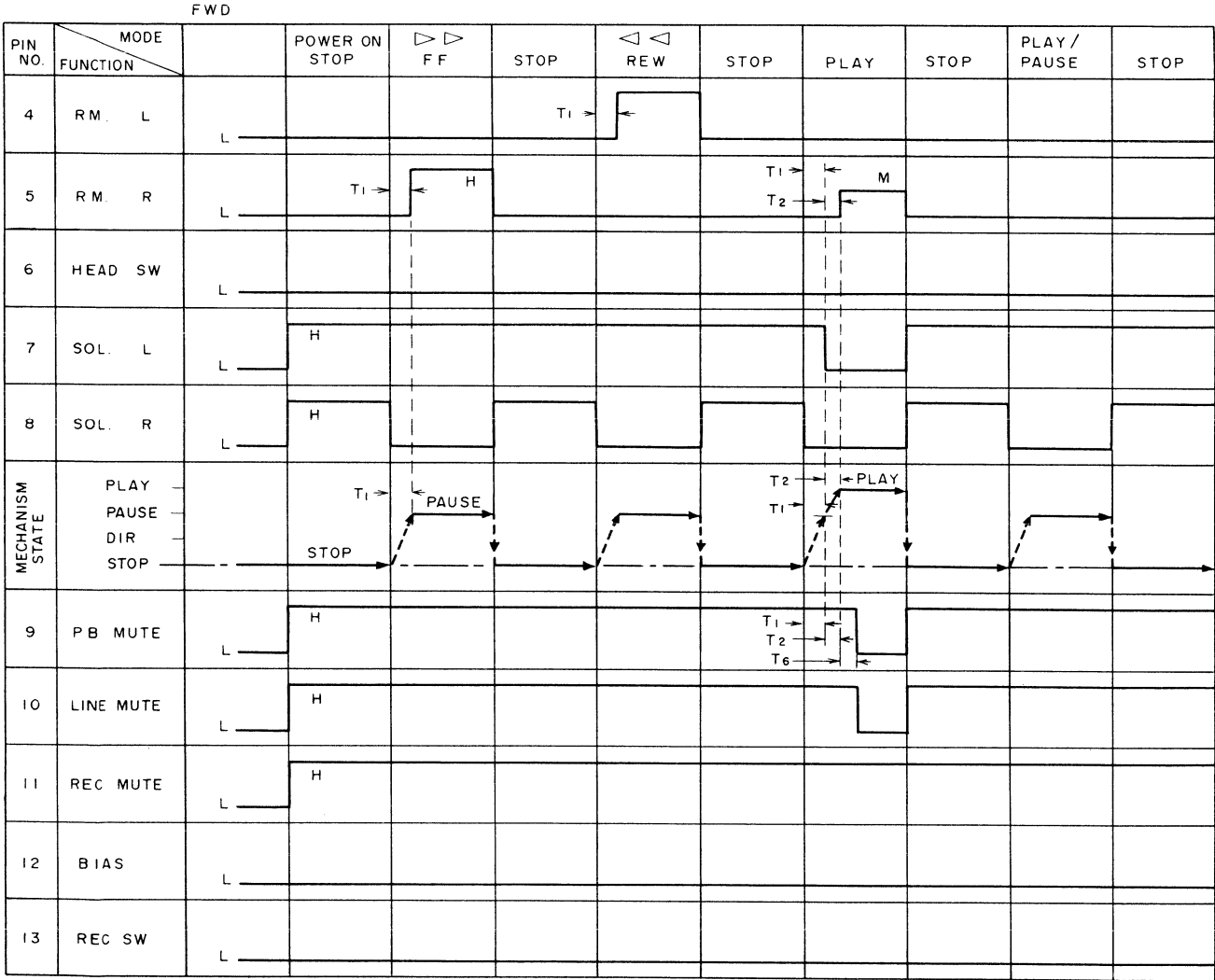


Fig. 4-10 Stop to REW.

Timing chart 1



T₁:425ms T₂:275ms T₃:275ms T₄:225ms T₅:125ms T₆:425ms T₇:425ms T₈:325ms T₉:75ms T₁₀:125ms

Fig. 4-11 Timing chart of PM3001

Timing chart 2

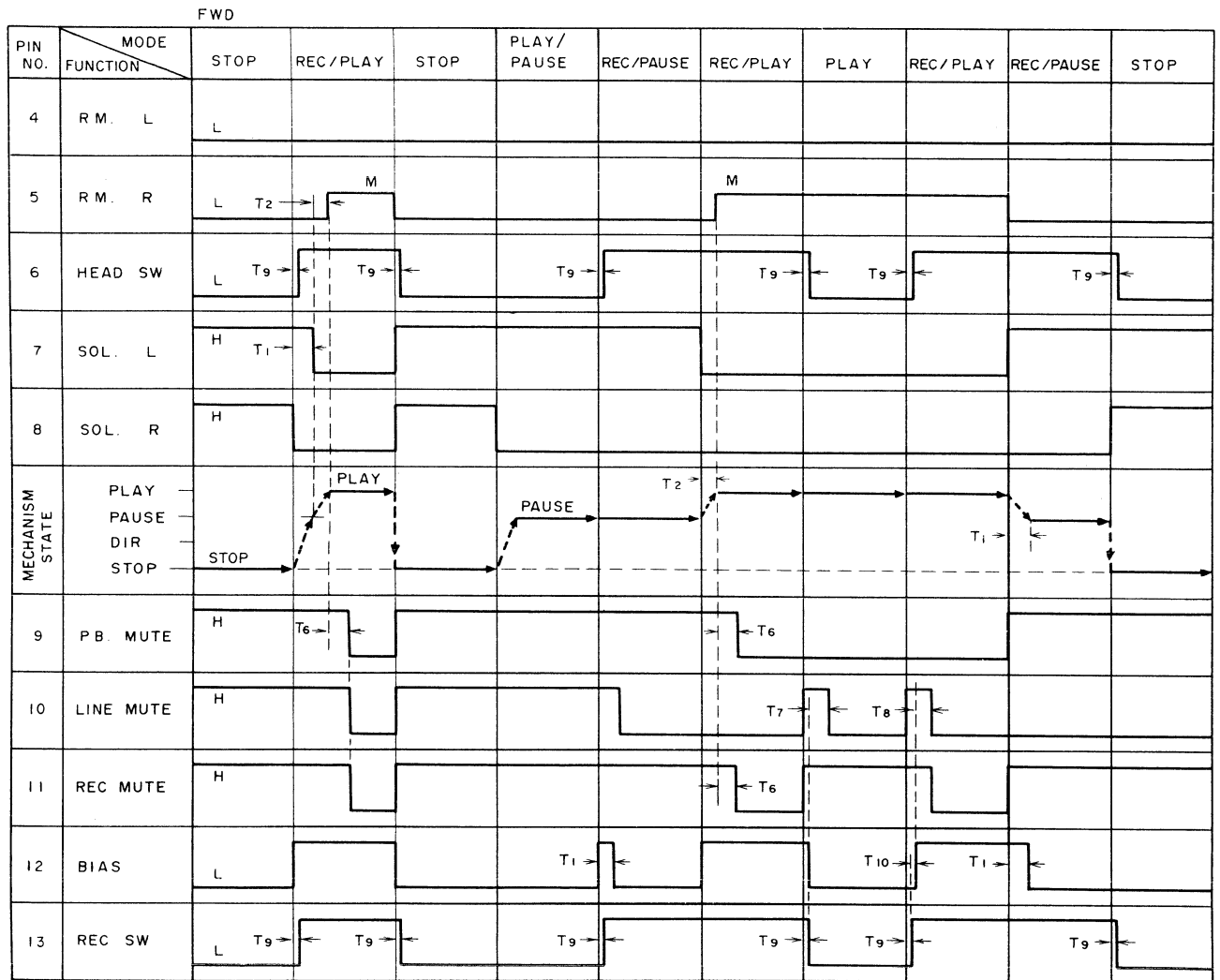


Fig. 4-12 Timing chart of PM3001

Timing chart 3

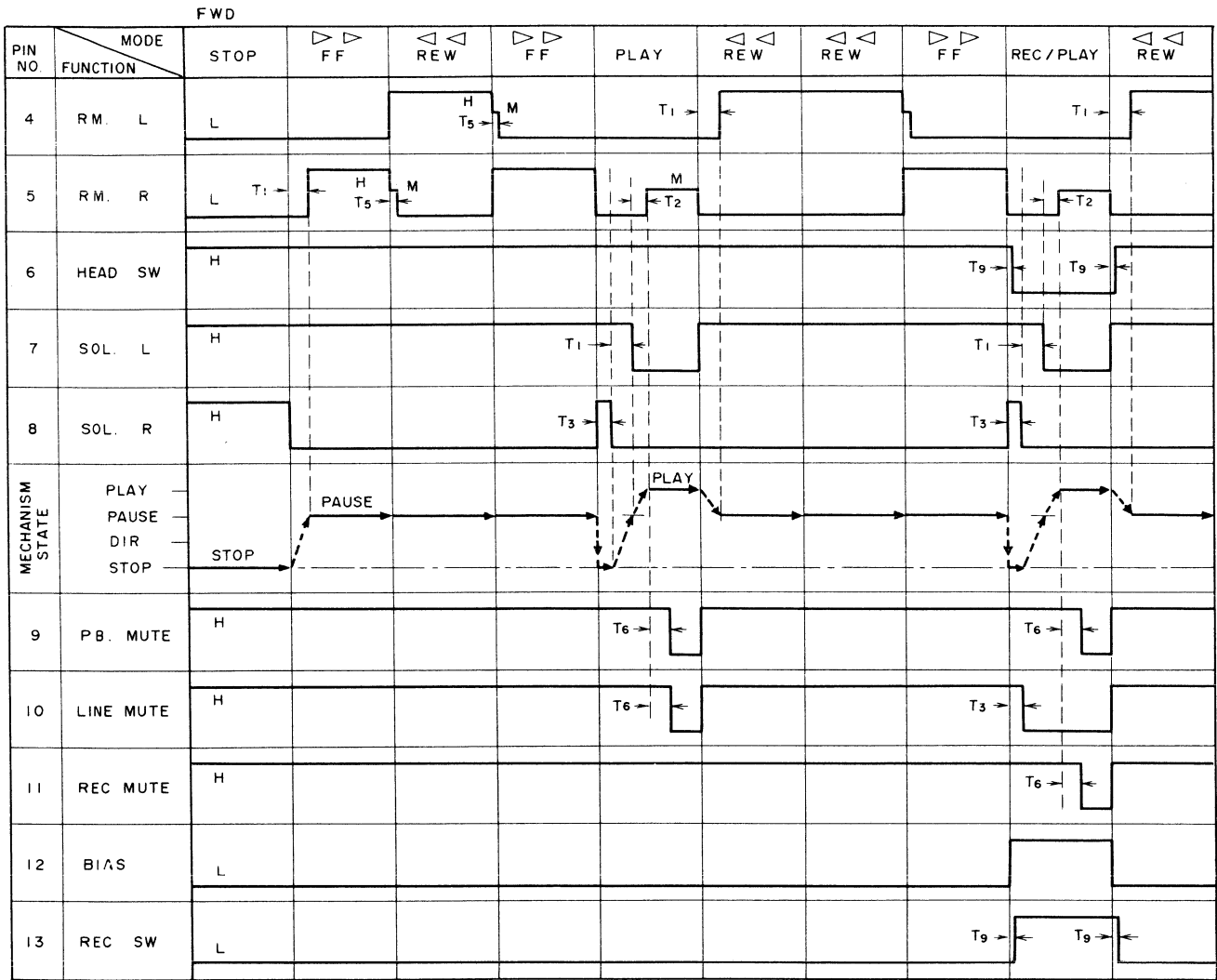
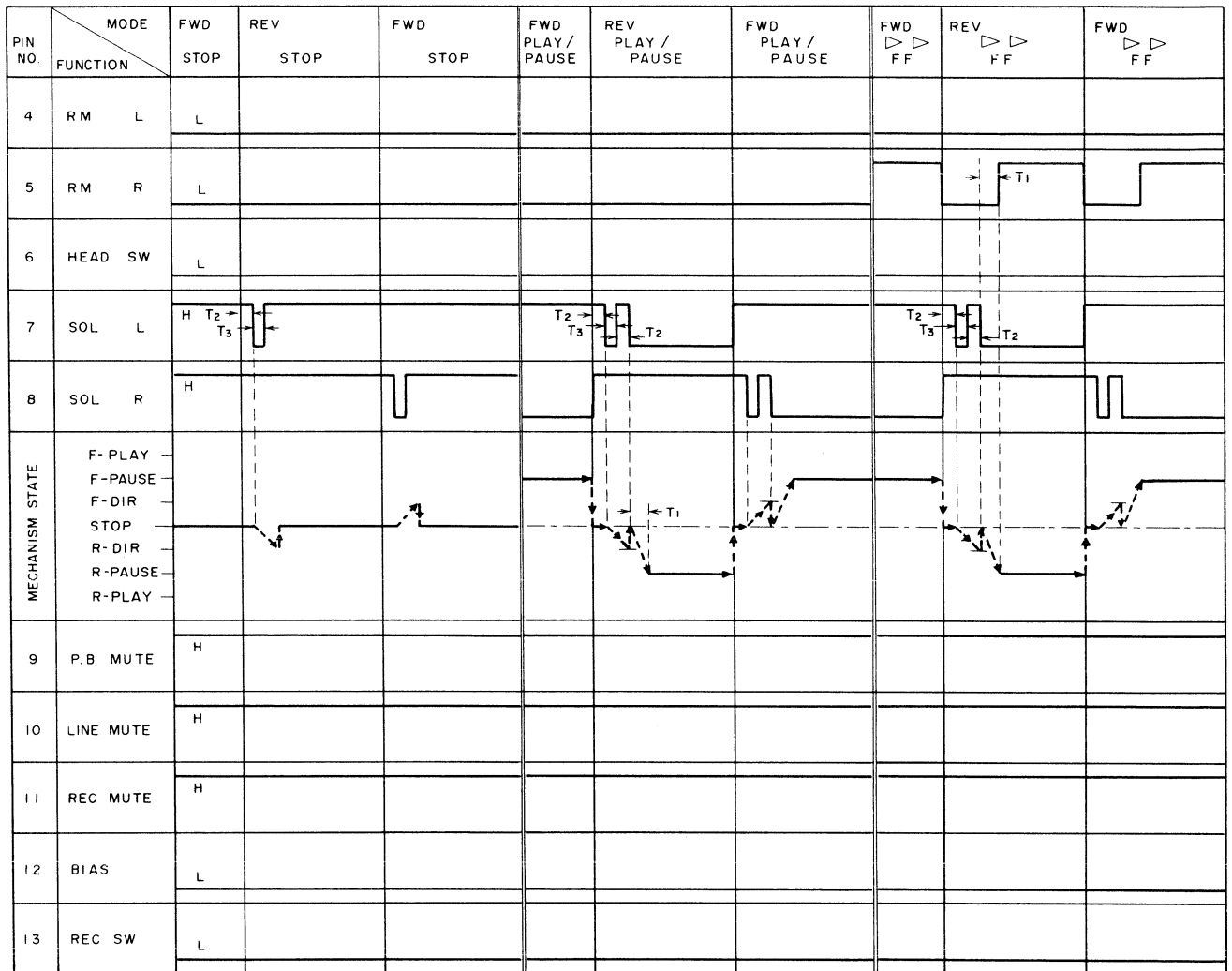


Fig. 4-13 Timing chart of PM3001

Timing chart 4



DIR : DIRECTION

Fig. 4-14 Timing chart of PM3001

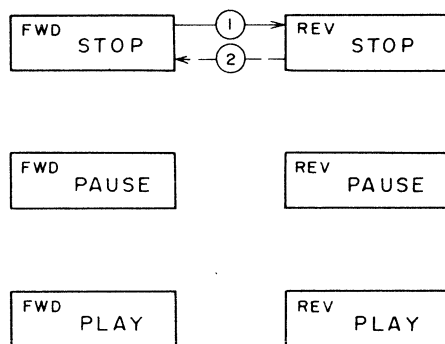


Fig. 4-15 Direction operation (in STOP status)

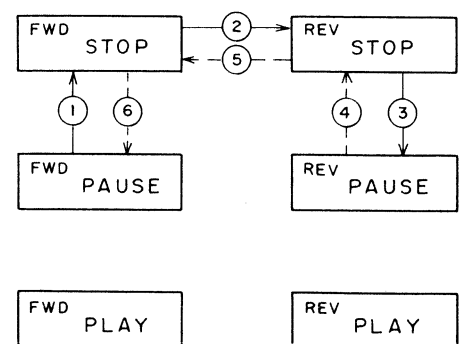
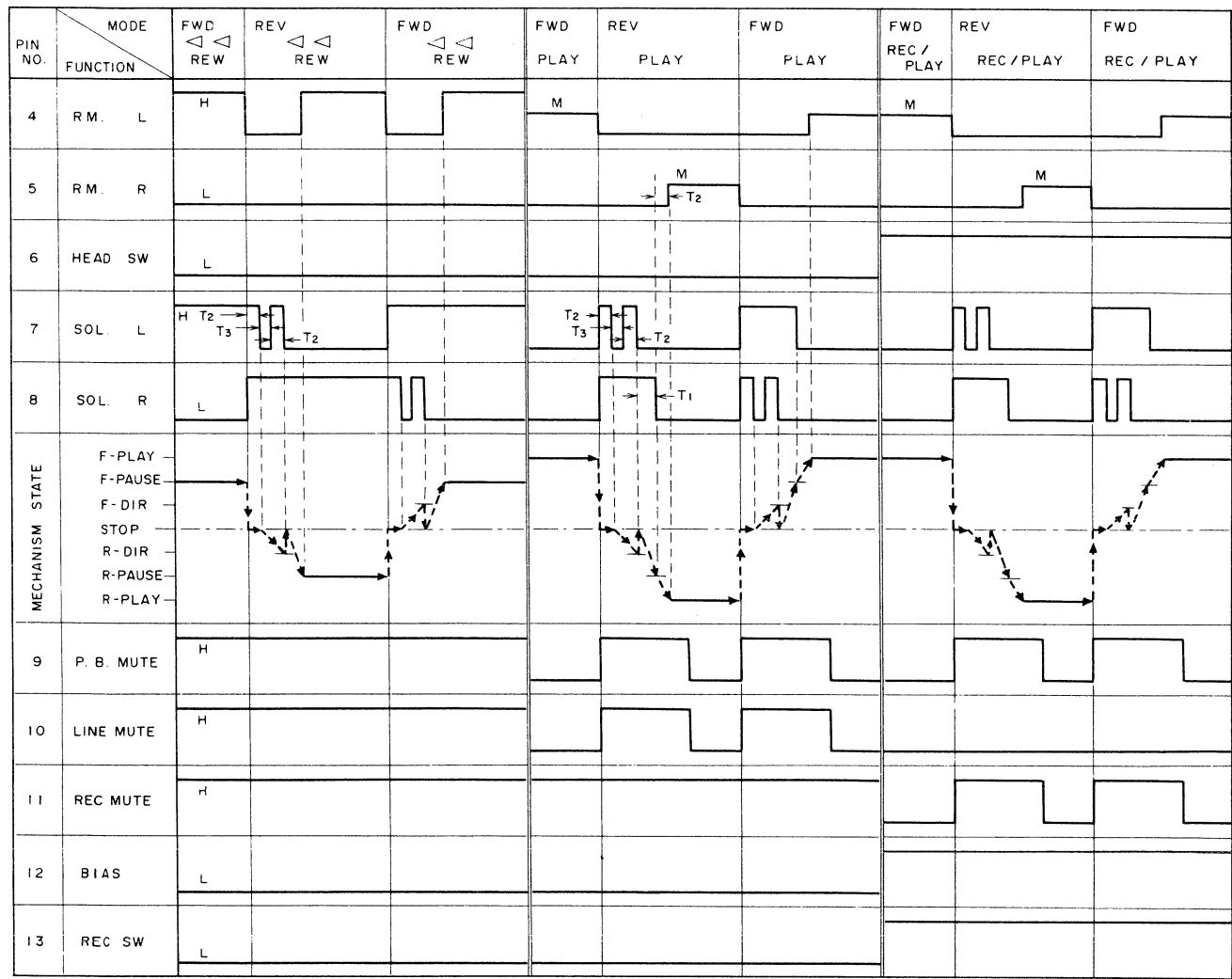


Fig. 4-16 Direction operation (in PAUSE, FF and status)

Timing chart 5



DIR : DIRECTION

Fig. 4-17 Timing chart of PM3001

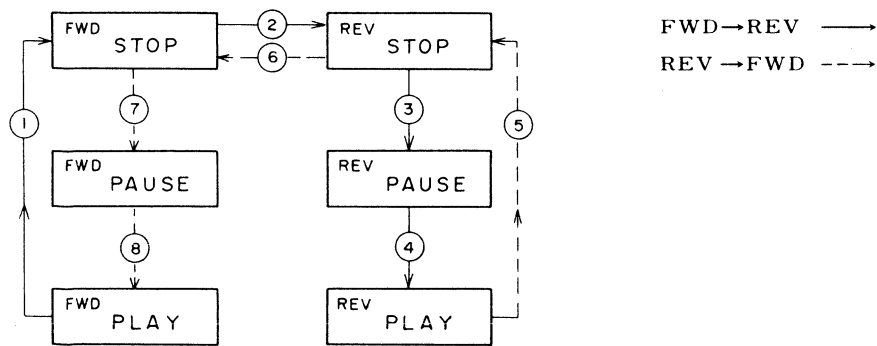


Fig. 4-18 Direction operation (in PLAY and REC/PLAY status)

Tape Leader Detector Circuit

The tape leader detection circuit functions in the auto-reverse mode to detect the point of transition from the coated portion to the leader portion of the tape. It then directs the mechanism to reverse the direction of travel, or places the unit in a STOP status when this event occurs from the fast-forward (FF) or rewind (REW) mode.

The detector uses an optical system based on an infrared LED whose emission is picked up by a phototransistor. The circuit is activated by detecting a difference in the amount of light passed by

the coated portion of tape, and the amount passed by the transparent leader.

The output from pin 16 of PA3010 is converted to light by the LED, and passes through the path shown in Fig. 4-20 to be picked up by the phototransistor. During tape travel, the amount of light received by the phototransistor is quite small, so the input level at pin 7 is held low. This causes the charge and voltage at pin 3 and 4 to also be held low, presenting a low logic input to the + and - terminals of comparator. This results in a low output from pin 2. But as the transparent leader

Pin No.	Symbol	I/O Status	Description
1	GND	—	
2	SENSING OUT	OUT	L level (0.5V max.) at magnetic coat portion of tape, and output of 100msec (min.) 4.9V (min.) pulse when leader portion of tape is reached.
3	SENSING T2	—	When the quantity of light received by the photo-sensitive transistor increases sharply, a comparator located in a later stage is activated (thereby generating output pulses) due to the difference in the charging time constants of the capacitors connected to pins 3 and 4. Output pulses appear when there is a sharp increase of at least 6dB in the input voltage.
4	SENSING T1	—	
5	VR2	—	Terminals for control of the feedback current capable of altering the gain of the compression circuit (compensation possible when there is fluctuation in the photo-sensitive transistor input).
6	VR1	—	
7	SENSING IN	IN	Photo-sensitive transistor output is applied to pin 7 after amplification (20dB).
8	Vcc1	—	20V DC
9	MS IN	IN	Tune interval detection input. A playback signal input above -73dBv denotes "tune", while an input level below that denotes a blank portion of tape between tunes. (Playback mode).
10	MS GAIN	—	Determines the gain of the tune-interval detection circuit.
11	MS MUTE	IN	Muting pin. Muting is applied if voltage greater than 1.6V is applied. Tune-interval detection circuit consequently stops operating (no tune-interval output).
12	MS T	—	Pin for determining the tune-interval detection time and the tune detection time by the capacitance of externally connected capacitors.
13	MS OUT	OUT	Tune-interval detection pin. L level (0.5V max.) for "tune" status, and H level (3.9V min.) for "tune-interval" status.
14	Vcc 2	—	5V DC
15	OSC C	—	Determination of the frequencies for activation of the infrared LED in the leader tape detector sensor utilizing externally connected capacitors.
16	OSC OUT	OUT	Infrared LED drive pin. 2kHz 40% duty pulse signal

NOTE:

The leader tape detector circuit generates pulse outputs when the leader tape is reached. Note, however, that PD6006 is not activated in the first few seconds after start of tape deck operation (playback, fast forward etc). Leader tape detection during that period, therefore, is not possible.

Fig. 4-19 PA3010 Pin description

passes into the light path, the amount of light picked up by the phototransistor suddenly increases the input to pin 7. This causes pin 3 to snap high, consequently applying a high input to the + terminal of the comparator. Output from pin 2 then goes high. As pin 3 goes high, the capacitor connected to pin 4 starts charging, raising the input level to the - terminal of the comparator. When the level of the - terminal reaches that of the + terminal, the output from the comparator snaps from high to low, and the output pulse taken from pin 2 appears as shown in Fig. 4-22.

CPU PD 6006 uses this output pulse to control the various mechanisms performing the mechanical functions of auto-reverse and automatic stop.

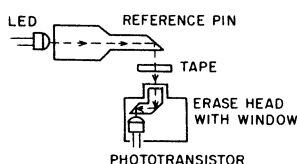


Fig. 4-20 Tape leader detector section

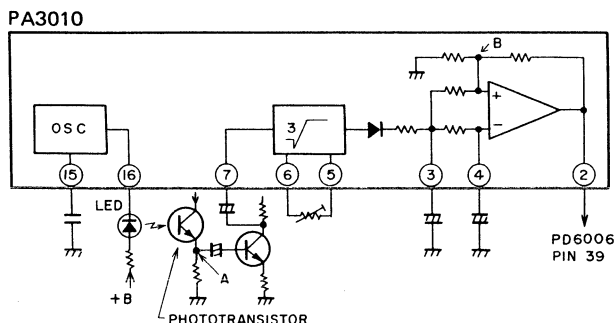


Fig. 4-21 Tape leader detector circuit

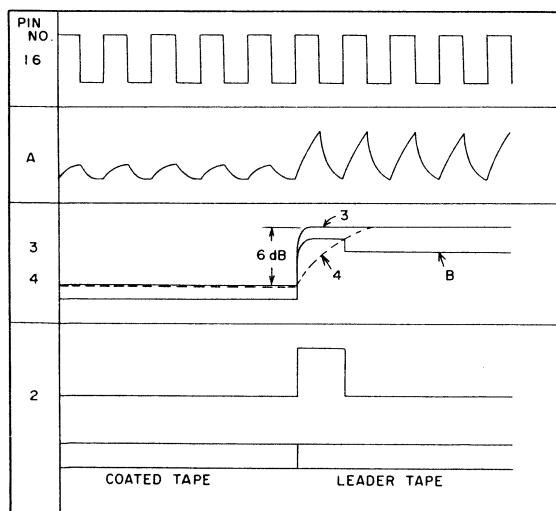


Fig. 4-22 Tape leader detector waves

Tape End Detector Circuit

When the reel motor starts turning, a sensing pulse is transmitted from pin 13 of IC PA2010 (used to control the reel motor) to pin 38 of PD6006. (This pulse is taken from the Hall element and shaped into a square wave by PA2010.) When this pulse is maintained at either a low (L) or high (H) level for a period exceeding three seconds, PD6006 interprets that to mean the end of the tape and thus switches to the next mode of operation.

If the mechanism is in the fast-forward (FF), rewind (REW), or record-playback (REC/PLAY) mode, the next mode entered is STOP. If it is presently in the PLAY mode and the $\rightarrow$ reverse mode switch is selected, it also enters the STOP mode. But if $\rightarrow$ is selected, it first goes through a direction operation, then into a PLAY status.

Since CT-X9 is equipped with a tape leader detector circuit, it goes into a STOP status or goes through a direction operation before reaching the point where the end sensor circuit is activated, so normally the end sensor circuit will not operate. However, where there is no leader on the cassette tape, or where there is an insufficient difference in the infrared transmission factor between the coated portion and leader portion of the tape, or in case the reel motor stops rotating before the tape leader is detected, the end sensor circuit is then activated, placing the unit in the STOP mode. However, in the REC/PLAY or PLAY mode, a direction operation may be called for depending on the position of the reverse mode switch.

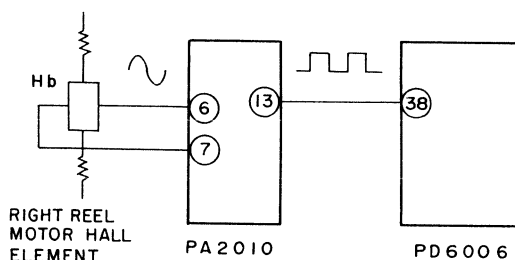


Fig. 4-23 Tape end detector circuit

Unrecorded Blank Detector Circuit

When the function key is placed ON, and the reel motor starts turning, pin 16 of PD6006 goes to a low level. When pin 16 goes low, pin 11 of the blank detector IC (PA3010) also goes low, lifting MS (Music Search) muting and commencing MS operations.

As MS MUTE is lifted, the signal is first amplified, then applied to pin 9, and its level is determined by the comparator in the next stage. Comparator output at point A is as shown in the accompanying table.

This output is used to turn Tr1 ON, and this in turn allows capacitor C connected to pin 12 to dump its charge through Tr1. Thus, pin 13 goes to a low level.

When there is no input signal present, Tr1 turns OFF, capacitor C starts recharging, and approximately 70msec later, a high level is output from pin 13.

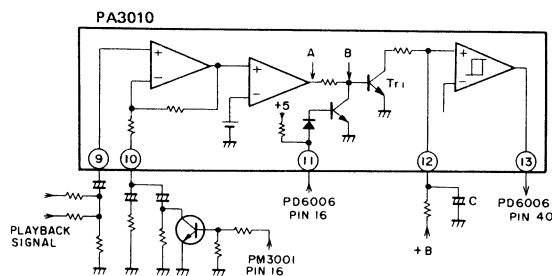


Fig. 4-24 Blank detector circuit

Consequently, when an input signal is present, pin 13 is at a low level, and no signal produces a high output. This output is used by each of the function operations (MS/SKIP, INDEX SCAN).

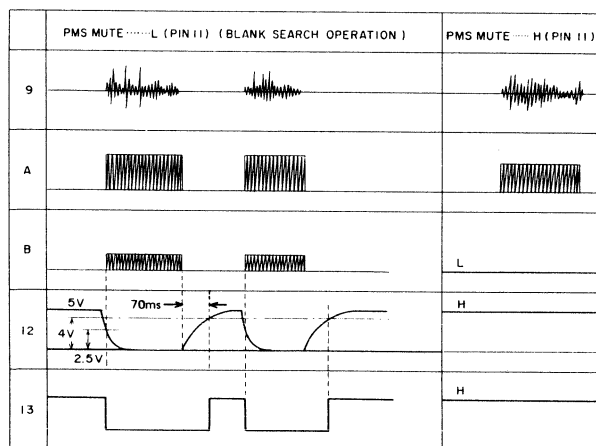


Fig. 4-25 Blank detector waves

Function Key Operation

The various functions (MS/SKIP, INDEX SCAN) are activated by placing the respective key to the ON position.

The timing chart for the pulses output from pins 10 and 11 of CPU PD6006 are shown in Fig. 4-26. As a function key is placed in the ON position, a pulse train is input to 37 of the CPU. The CPU then determines the timing of the pulse train, and starts operation of the selected mode accordingly.

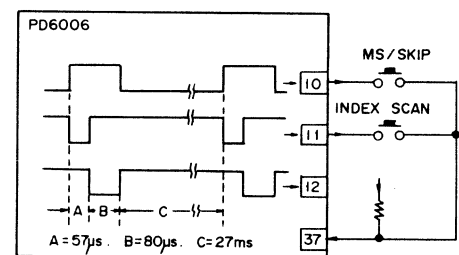


Fig. 4-26 Function key diagram

MS/SKIP Operation

When the MS/SKIP Key is placed ON, the FF (>>) key is activated, and when the beginning of a music selection is located, pin 13 of PA3010 drops from high to low. The trailing edge of the pulse effecting the level drop at the PD6006 pin sets the REWIND mode and rewinds the tape back to the beginning of the selection, and enters the PLAY mode.

At the end of the selection, if the unrecorded section of the tape (functioning to change the output from pin 13 from low to high) holds the level continuously high for over 8 seconds, PD6006 then selects the FF mode, continuing in that mode until the beginning of the next selection drops the level at pin 13 low. It then rewinds (<<) back out to the beginning of the selection, and enters the PLAY mode.

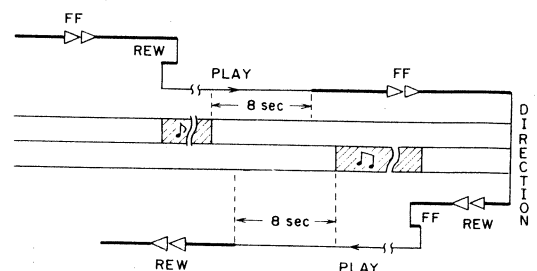


Fig. 4-27 MS/SKIP operation

INDEX SCAN Operation

When INDEX SCAN is activated, if the unit is operating in the FWD direction, the FF (▷▷) mode is entered; if in REV, REW (◁◁) is entered. The unit then cycles through a search operation to locate the beginning of a selection, then goes into the PLAY mode. Playback of the selection starts and continues for the 7 seconds that pin 13 of PA3010 is held low.

After this 7 seconds has elapsed, it once again returns to the FF or REW mode and cycles through another search operation until all selections on the tape are thus indexed.

If the tape should end while the unit is in FWD FF, or REV REW, either the STOP status would be entered, or a direction operation would allow search to continue, depending on the reverse mode switch setting.

When in INDEX SCAN operation, REW KEY (FF KEY in REV direction) is placed ON, INDEX SCAN is operated in REW mode as shown in Fig. 4-28.

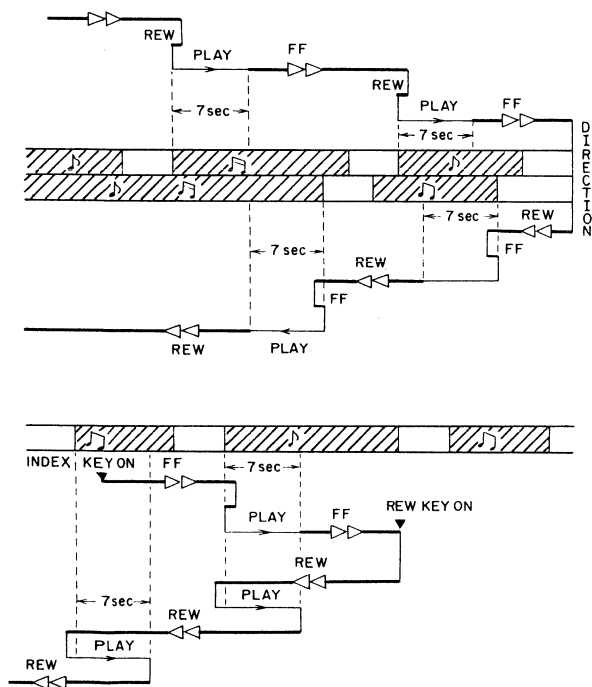


Fig. 4-28 INDEX SCAN operation

Auto Function Operations

• PLAY command output

When PLAY mode is selected in the CT-X9, an output signal (L level = ground) is generated to automatically switch the auto function type amplifier (such as the A-X7 or A-X8 stereo amplifier of the same series) to tape playback mode.

Pin 10 (LINE MUTE) of PM3001 (see Fig. 4-29) is switched to L level only when the tape deck is switched to recording or playback mode. In this case, Q317 is turned off, resulting in an H level appearing at the collector. Pin 13 (REC) of PM3001 is switched to H level only during recording mode. The REC signal (L level only during recording mode) is obtained by passing the REC signal via an inverter. The NAND 1 output, therefore, is at L level only during playback mode, and by passing this output via another inverter, Q319 is turned on during playback mode, and an L level (ground) output is obtained.

• STOP command input

When the auto function type amplifier (such as A-X7 or A-X8) is switched from tape playback mode (CT-X9 in playback mode) to another mode, the CT-X9 is stopped automatically by a circuit in the tape deck. A negative input pulse signal from the amplifier is applied to this circuit when the amplifier FUNCTION switch is switched from tape playback to another mode. This input is inverted to a positive pulse by an inverter and is subsequently applied to NAND 2. Since the other input of this NAND gate is the PLAY signal (at H level only during playback mode), the NAND 2 output will be a negative pulse signal if the CT-X9 is in playback mode. This output pulse is applied to pin 23 (STOP) of PD6006, thereby switching the tape deck to stop mode.

• Recording pause control input (for synchronized recording)

If an auto function type turntable (such as PL-X7 or PL-X9) is put into playback status (when tonearm is lowered onto a record) with the CT-X9 in recording pause mode, the pause is released and the tape deck put into REC/PLAY (recording) mode. The same circuit is also involved in switching the tape deck back to recording pause mode if turntable playback is stopped (when the tonearm is lifted).

When the tonearm is lowered, the turntable (PL-X7 or PL-X9) control signal circuit is switched to L level (ground). This signal is passed to the CT-X9 via the amplifier (A-X7 or A-X8 Stereo Amplifier), and is inverted to become a positive pulse signal by inverter and C344 before being

applied to NAND 3. Since Q320 is off during recording mode, the other NAND 3 input (PAUSE signal) is switched to H level when the deck is in pause mode. Hence, if the CT-X9 is in recording pause mode, the negative pulse output from NAND 3 is applied to pin 26 (PAUSE) of PD6006. CT-X9 is thus switched to recording mode. When the tonearm is lifted, the control signal circuit is switched to H level. (With the turntable end open, the same circuit is connected to a +B pull-up resistance). C345 is consequently charged up, and there is a drop in the input voltage of the voltage comparator, the comparator output being switched

to L level if the decreasing input voltage drops below a specific level. The output signal is converted by an inverter and C346 to become a positive signal before being applied to NAND 4. Since Q322 is off during recording mode, the other NAND 4 input (PAUSE signal) is an H level signal except during pause mode. Consequently, the negative pulse output from NAND 4 is applied to pin 26 (PAUSE) of PD6006 if the CT-X9 is in recording mode at the time. The CT-X9 recording mode is thus switched to recording pause mode to temporarily interrupt the recording.

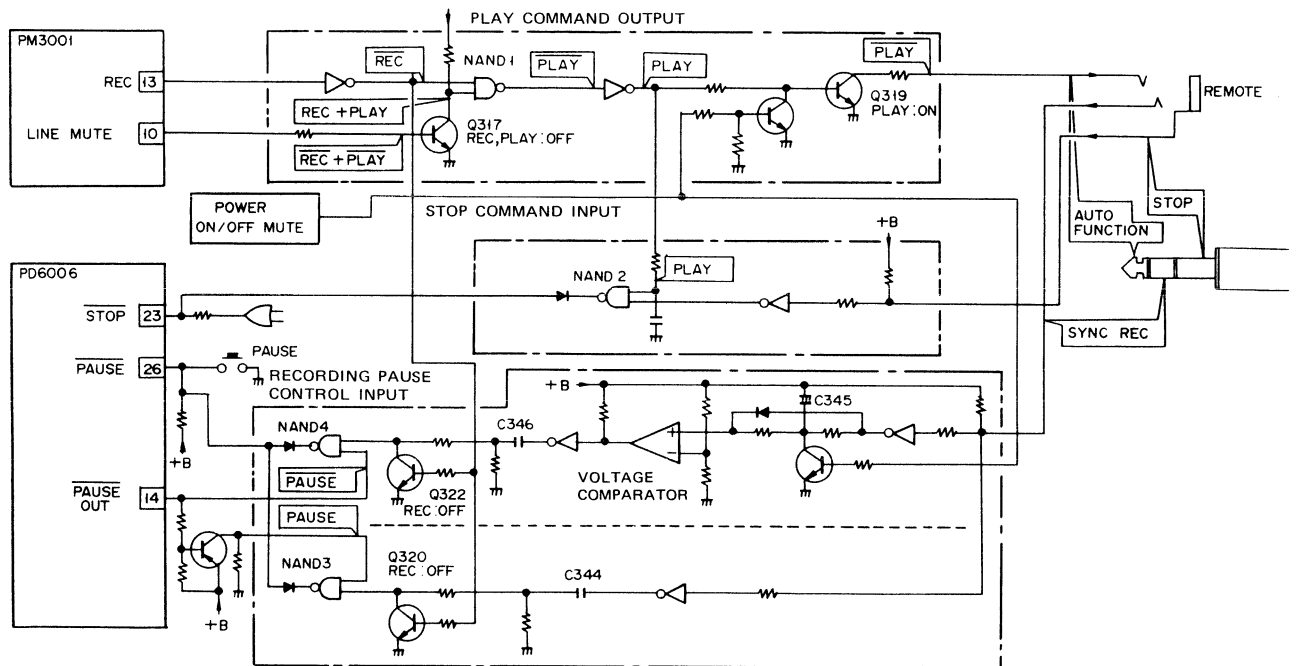


Fig. 4-29 Auto function control circuit

5. DISASSEMBLY

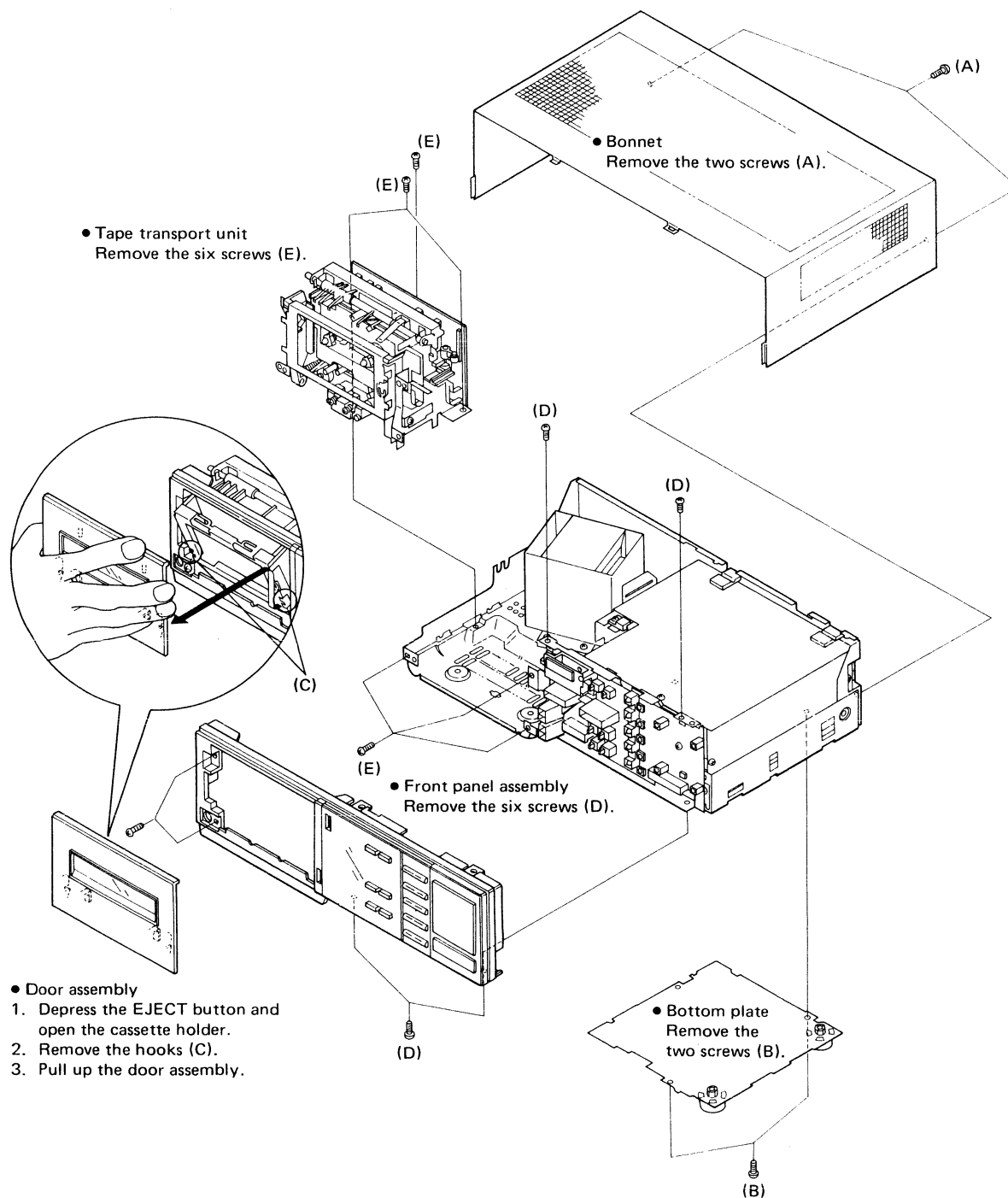


Fig. 5-1 Disassembly

Removing the Head Assembly

1. Remove the two azimuth adjustment screws and remove the stopper holder.
2. Remove the stopper.
3. Push the slide plate all the way to the right (the forward position) and pull the head assembly in the direction of the arrow to remove it.

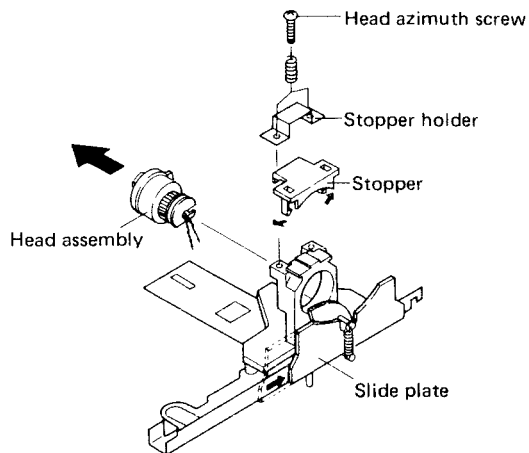


Fig. 5-2 Disassembly of the head assembly

Removal of the Capstan Belt

Undo screws (F), remove the capstan motor control ass'y, and then remove the capstan belt.

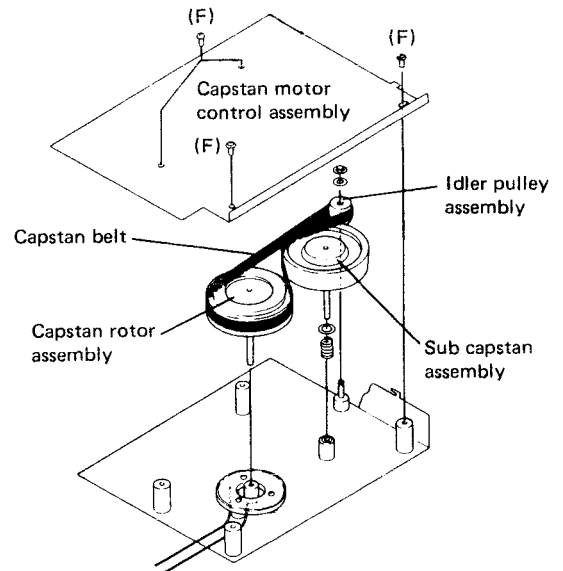


Fig. 5-4 Removal of the capstan belt

Reassembly Precautions

When replacing the head assembly, be sure the gears mesh as shown in Fig. 5-3.

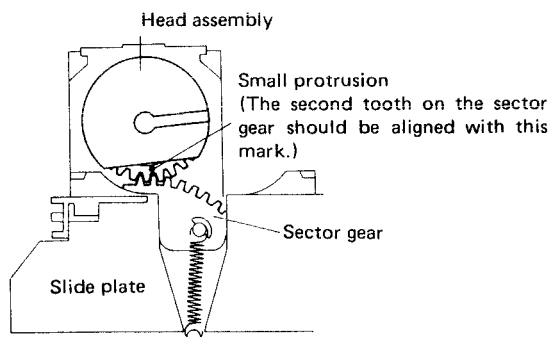


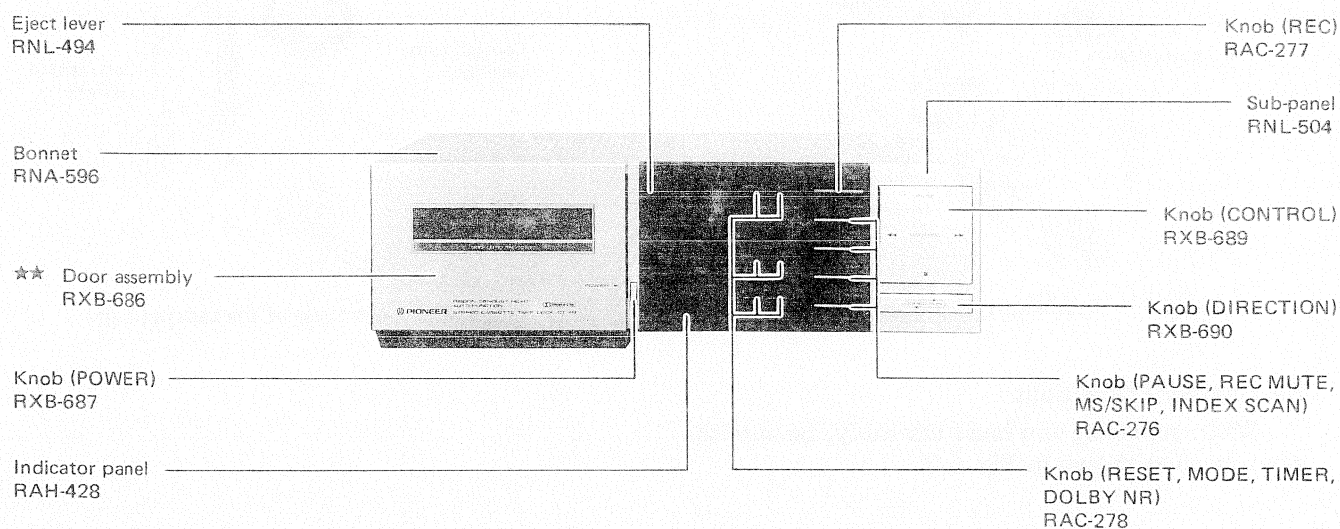
Fig. 5-3 Relationship between head assembly and sector gear

6. PARTS LOCATION

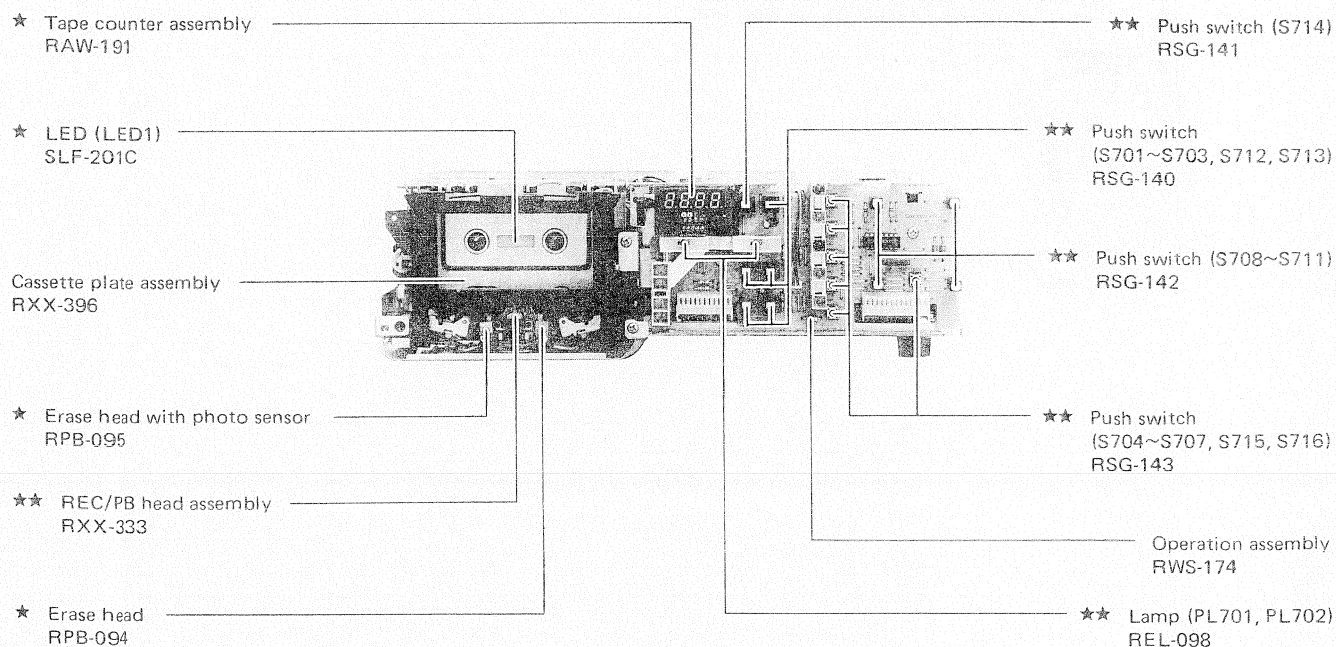
NOTES:

- Parts without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.
 $\star\star$ GENERALLY MOVES FASTER THAN $\star$.
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

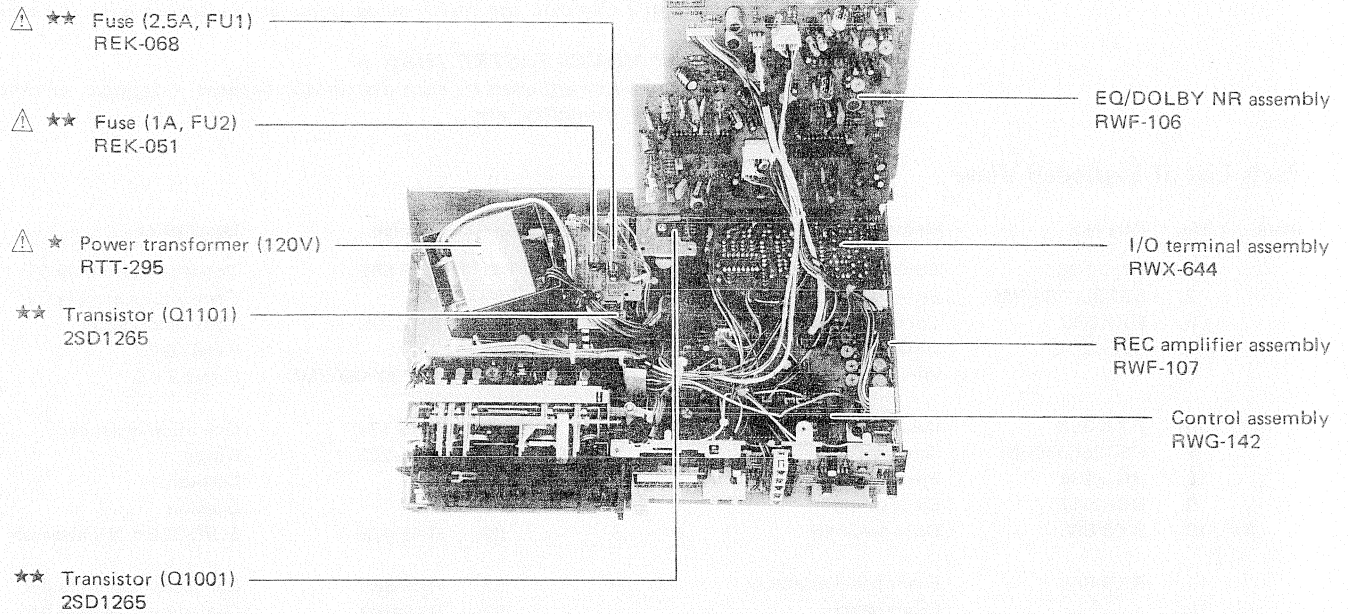
Front Panel View



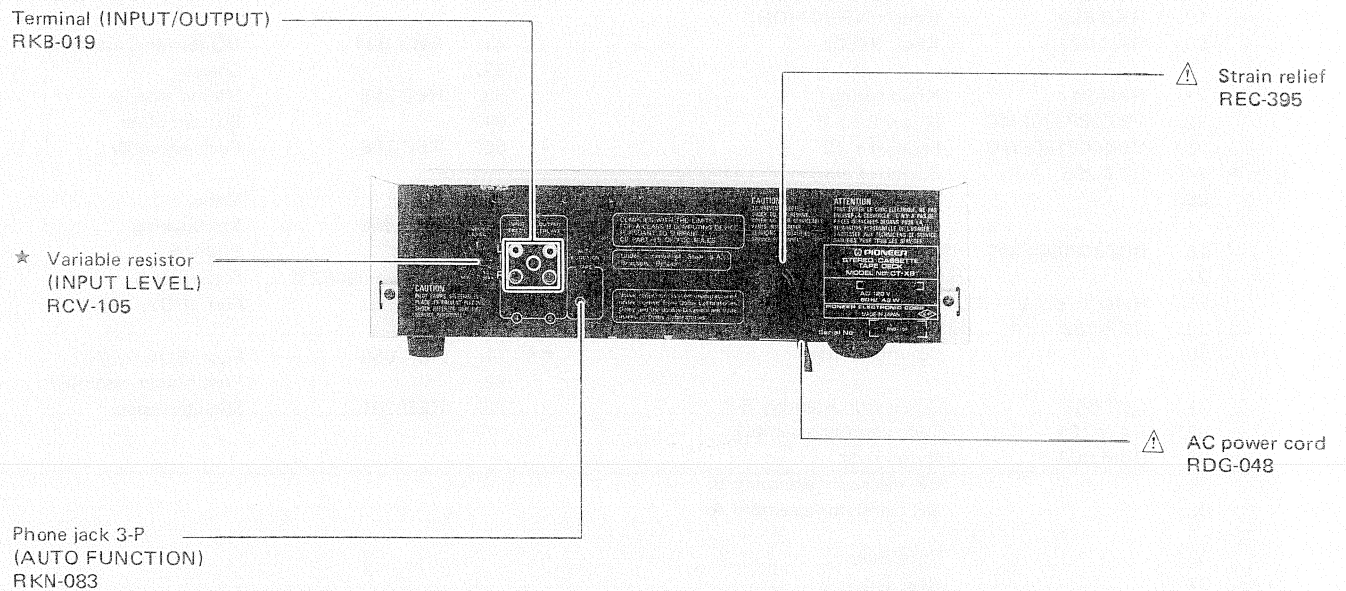
Front View with Panel Removed



Top View



Rear Panel View



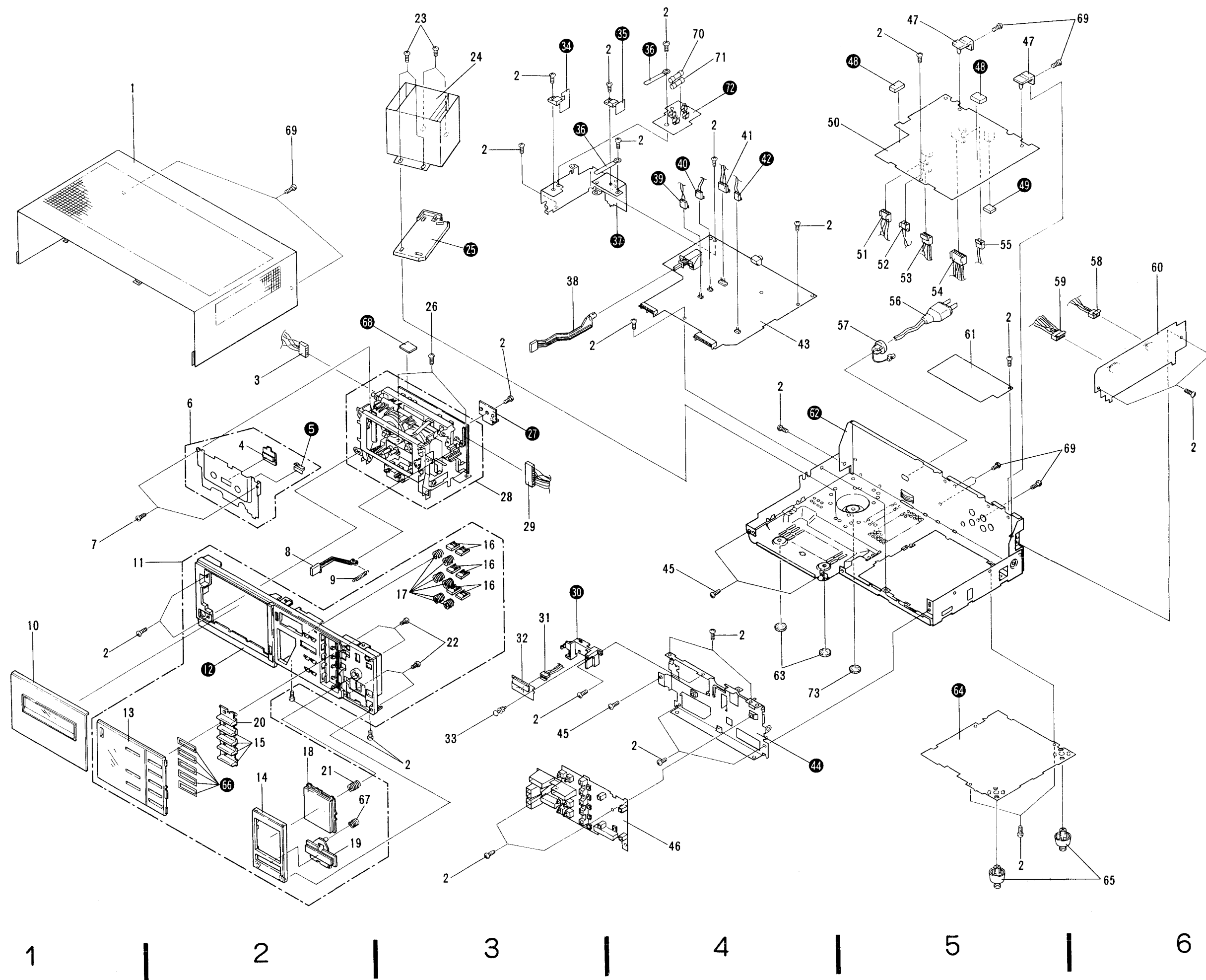
7. EXPLODED VIEW

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
- **★★ GENERALLY MOVES FASTER THAN ★.**
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Parts List of Exploded View

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description	
★	1.	RNA-596	Bonnet		41.	RKP-655	Connector assembly 3-P	
	2.	BBZ30P080FMC	Screw 3 x 8		42.		Connector assembly 2-P	
	3.	RKP-666	Connector assembly 5-P		43.	RWG-142	Control assembly	
	4.	SLF-201C	LED (LED 1)		44.		Panel stay	
	5.		Wire holder		45.	BCZ30P050FMC	Screw 3 x 5	
★★	6.	RXX-396	Cassette plate assembly		46.	RWS-174	Operation assembly	
	7.	BBZ26P060FNi	Screw 2.6 x 6		47.	RNL-223	Hinge	
	8.	RNL-494	Eject lever		48.		Cushion	
	9.	RBH-947	Eject spring		49.		Cushion	
	10.	RXB-686	Door assembly		50.	RWF-106	EQ/DOLBY NR assembly	
	11.	RXB-688	Front panel assembly		51.	RKP-658	Connector assembly 4-P	
	12.		Front panel		52.	RKP-650	Connector assembly 3-P	
	13.	RAH-428	Indicator panel		53.	RKP-640	Connector assembly 5-P	
	14.	RNL-504	Sub-panel		54.	RKP-652	Connector assembly 6-P	
	15.	RAC-276	Knob (PAUSE, REC MUTE, MS/SKIP, INDEX SCAN)		55.	RKP-656	Connector assembly 3-P	
	16.	RAC-278	Knob (RESET, MODE, TIMER, DOLBY NR)	⚠	56.	RDG-048	AC power cord	
	17.	RBH-942	Knob spring	⚠	57.	REC-395	Strain relief	
	18.	RXB-689	Knob (CONTROL)		58.	RKP-657	Connector assembly 4-P	
	19.	RXB-690	Knob (DIRECTION)		59.	RKP-649	Connector assembly 6-P	
	20.	RAC-277	Knob (REC)		60.	RWF-107	REC amplifier assembly	
	21.	RBH-941	Knob spring		61.	RWX-644	I/O terminal assembly	
	22.	VBZ26P080FMC	Screw 2.6 x 8		62.		Chassis	
	23.	VBZ40P120FMC	Screw 4 x 12		63.	REC-355	Sliding stopper	
⚠	★	RTT-295	Power transformer (120V)		64.		Bottom plate	
	25.		Transformer base		65.	REC-369	Foot assembly	
	26.	BCZ30P050FMC	Screw 3 x 5		66.		Mask	
	27.		Heat sink		67.	RBH-958	Knob spring	
	28.	Refer to pp. 29–32.			68.		Cushion	
	29.	RKP-489	Connector assembly 10-P	⚠	★★	70.	REK-051	Fuse (FU2, 1A)
	30.		Counter holder	⚠	★★	71.	REK-068	Fuse (FU1, 2.5A)
	31.	RKP-648	Connector assembly 5-P		72.		Fuse holder assembly	
	32.	RAW-191	Tape counter assembly		73.	RED-201	Sliding stopper	
	33.	RBM-003	Nylon rivet					
	34.		VR transistor assembly B					
	35.		VR transistor assembly A					
	36.		Cord fixer					
	37.		Heat sink					
	38.	RXB-687	Knob (POWER)					
	39.		Connector assembly 2-P					
	40.		Connector assembly 2-P					



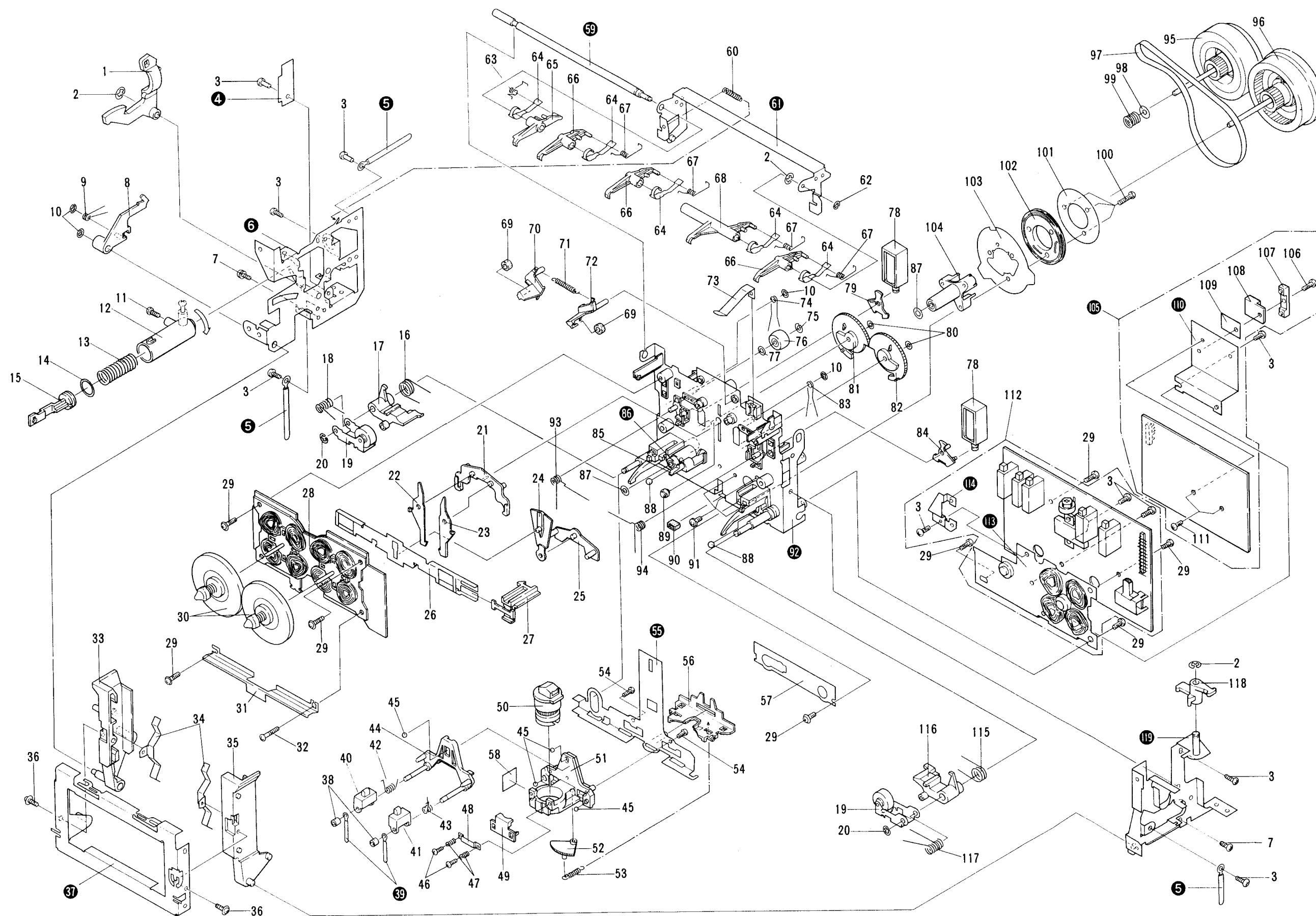
Parts List of Tape Transport Mechanism

- NOTES:
- Parts without part number cannot be supplied.
 - The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - For your Parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.
- $\star\star$ GENERALLY MOVES FASTER THAN $\star$.
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	RNL-266	Lock arm		46.	RBA-080	Azimuth screw
	2.	YE30FUC	Washer E-type		47.	RBH-853	Azimuth spring
	3.	VCZ30P060FMC	Screw 3 x 6		48.	RNH-140	Stopper holder
	4.		Connection board		49.	RNL-262	Stopper
	5.		Cord fixer	$\star\star$	50.	RXX-333	REC/PB head assembly
	6.		Side frame L3 assembly		51.	RXB-661	Housing assembly
	7.	PMA30P060FMC	Screw 3 x 6		52.	RNL-312	Sector gear
	8.	RNL-265	Eject prevent lever		53.	RBH-906	Gear spring
	9.	RBH-849	Lever spring		54.	BMZ26P050FMC	Screw 2.6 x 5
	10.	YS24FBT	Washer CS-type		55.		Head base assembly
	11.	VCZ26P060FMC	Screw 2.6 x 6		56.	RNL-317	Slide plate
	12.	RNL-261	Cylinder		57.	RNH-146	Head base spring
	13.	RBH-937	Damper spring		58.	REC-377	Shield sheet
	14.	REB-447	O-ring		59.		Main shaft
	15.	RNL-510	Piston		60.	RBH-946	Arm spring
	16.	RBH-861	Pinch return spring L		61.		Arm assembly
	17.	RNL-267	Sub pinch arm		62.	YE20FUC	Washer E-type
	18.	RBH-851	Pinch pressure spring		63.	RBH-944	Switch lever spring A
$\star\star$	19.	RXB-550	Pinch roller arm assembly		64.	RNH-198	Switch lever
	20.	YE25FUC	Washer E-type		65.	RNL-506	REC detector arm
	21.	RNG-319	Cam follow lever		66.	RNL-507	Chrom detector arm
	22.	RNL-435	Hook L		67.	RBH-945	Switch lever spring B
	23.	RNL-436	Hook R		68.	RNL-508	Metal detector arm
	24.	RNL-255	Connection plate		69.	REB-473	Brake shoe (B)
	25.	RNL-306	Pinch plate		70.		Brake plate L
	26.	RNH-077	Change plate		71.	RBH-927	Brake spring
	27.	RNL-509	Actuator		72.	RNL-434	Brake plate R
$\star\star$	28.	RXX-363	Reel motor assembly B II		73.	RBK-164	Half set spring
	29.	ATZ26P080FMC	Screw 2.6 x 8		74.	RBH-847	Spring R
	30.	RXX-365	Rotor assembly		75.	WA017D034D025	Washer
	31.	RNH-117	Shield plate		76.	RXB-620	Idler pulley assembly
	32.	VCZ26P140FMC	Screw 2.6 x 14	Δ	77.	WA21D040D025	Washer
	33.	RNL-515	Pocket L	$\star$	78.	RXP-111	Plunger solenoid
	34.	RBK-167	Pressure spring		79.	RNL-256	Trigger lever L
	35.	RNL-398	Pocket R		80.	RBH-058	Washer
	36.	ATZ30P080FMC	Screw 3 x 8		81.	RNL-307	Assist gear L
	37.		Holder assembly		82.	RNL-308	Assist gear R
	38.	RBA-073	Special nut		83.	RBH-486	Spring L
	39.		Cord fixer		84.	RNL-257	Trigger lever R
$\star$	40.	RPB-095	Erase head with photo sensor		85.	RNL-309	Reference pin
$\star$	41.	RPB-094	Erase head		86.		Metal sleeve
	42.	RBH-863	Height adjust spring L		87.	RBH-030	Oil stopper washer
	43.	RBH-864	Height adjust spring R		88.	REF-023	Steel ball (4 ϕ)
	44.	RXB-671	Erase head base assembly		89.	RLB-434	Guide roller
	45.	REF-022	Steel ball (3 ϕ)		90.	REB-260	Stopper

Mark	No.	Part No.	Description
	91.	PMA26P050FMC	Screw 2.6 x 5
	92.		Chassis
	93.	RBH-961	Ratch spring L
	94.	RBH-962	Ratch spring R
	95.	RXB-696	Sub capstan assembly
	96.	RXX-395	Capstan rotor assembly
$\star\star$	97.	REB-480	Capstan belt
	98.	RBH-059	Washer
	99.	RBH-923	Spring (B)
	100.	BMZ26P080BNi	Screw 2.6 x 8
	101.	RNH-064	FG plate
	102.	RXX-334	FG coil assembly
	103.	RNH-202	FG shield plate
	104.	RXB-697	Housing assembly
	105.		RM control assembly B
	106.	RBA-026	Screw
	107.	RKH-005	Holder
	108.	2SC1173	Transistor
	109.	REE-051	Spacer
	110.		Heat sink A
	111.	VCZ30P100FMC	Screw 3 x 10
	112.	RWX-654	CM control assembly
	113.		CM base plate assembly
	114.		Heat sink B
	115.	RBH-862	Pinch return spring R
	116.	RNL-268	Sub pinch arm R
	117.	RBH-852	Pinch pressure spring R
	118.	RNL-512	Eject lever
	119.		Side frame R assembly

Tape Transport Mechanism

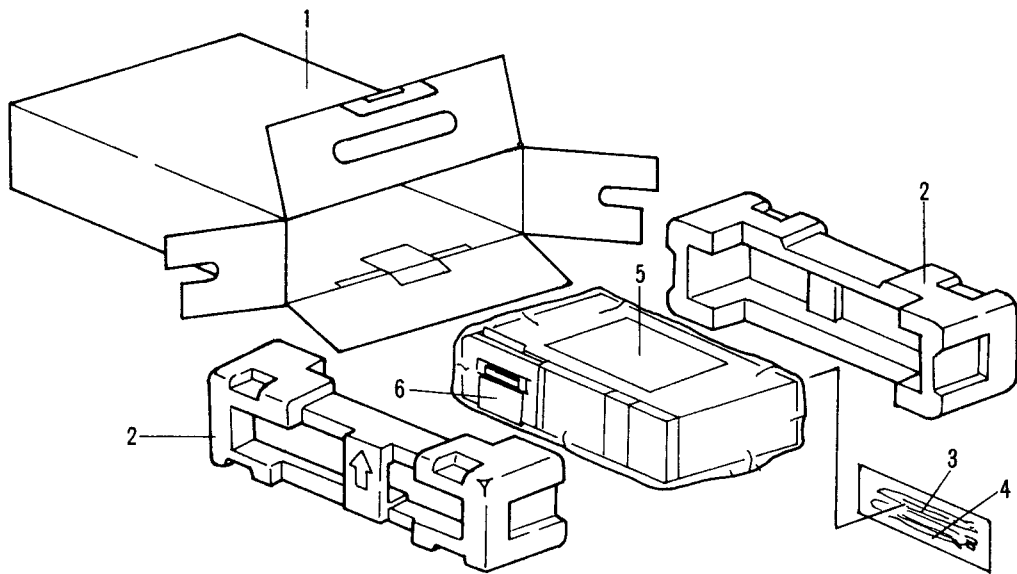


8. PACKING

A

Mark	No.	Part No.	Description
	1.	RHG-563	Packing case
	2.	RHA-249	Side pad
	3.	RDE-053	Connection cord
	4.	RDE-069	Connection cord (with control leads)
	5.	RRB-195	Operating instructions
	6.	REE-083	Label
		REC-383	Stopper (For label)

B

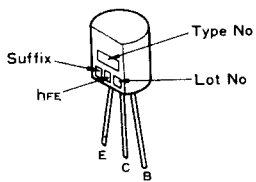


C

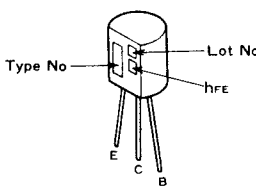
D

External Apperance of Transistors and ICs

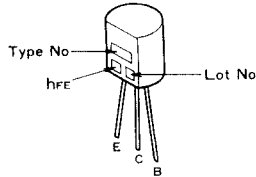
2SA933LN
2SC1740LN



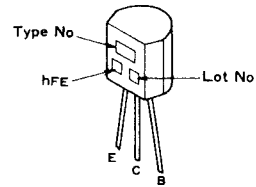
2SA1015
2SC1815



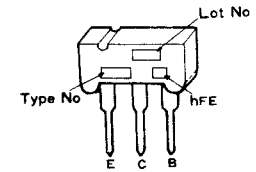
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2SC2634NC



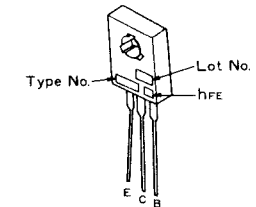
2SA934
2SC2060



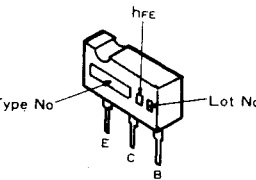
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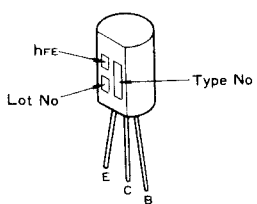
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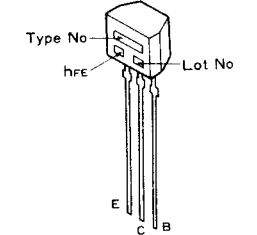
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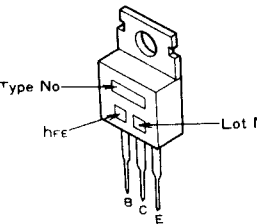
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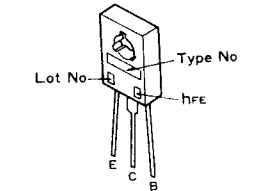
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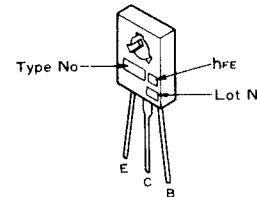
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2SD313
2SD880



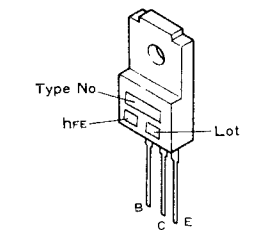
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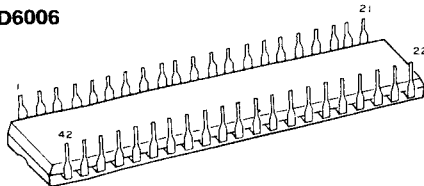
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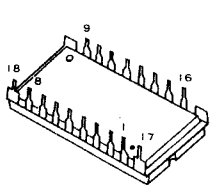
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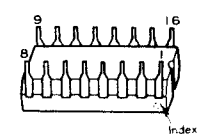
PD6006



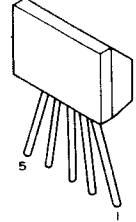
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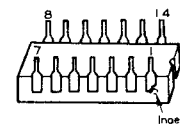
PA3010
PA2009
PA2011



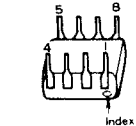
M51202L



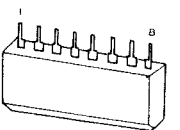
TC4011BP
μPD4011BC
TC4069UBP
μPD4069UBC
TC4071BP
μPD4071BC



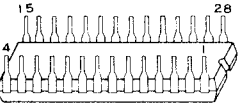
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BA4558



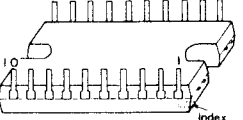
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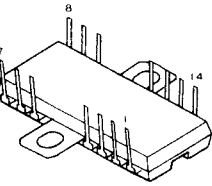
PA3012



PA2010



PA2012



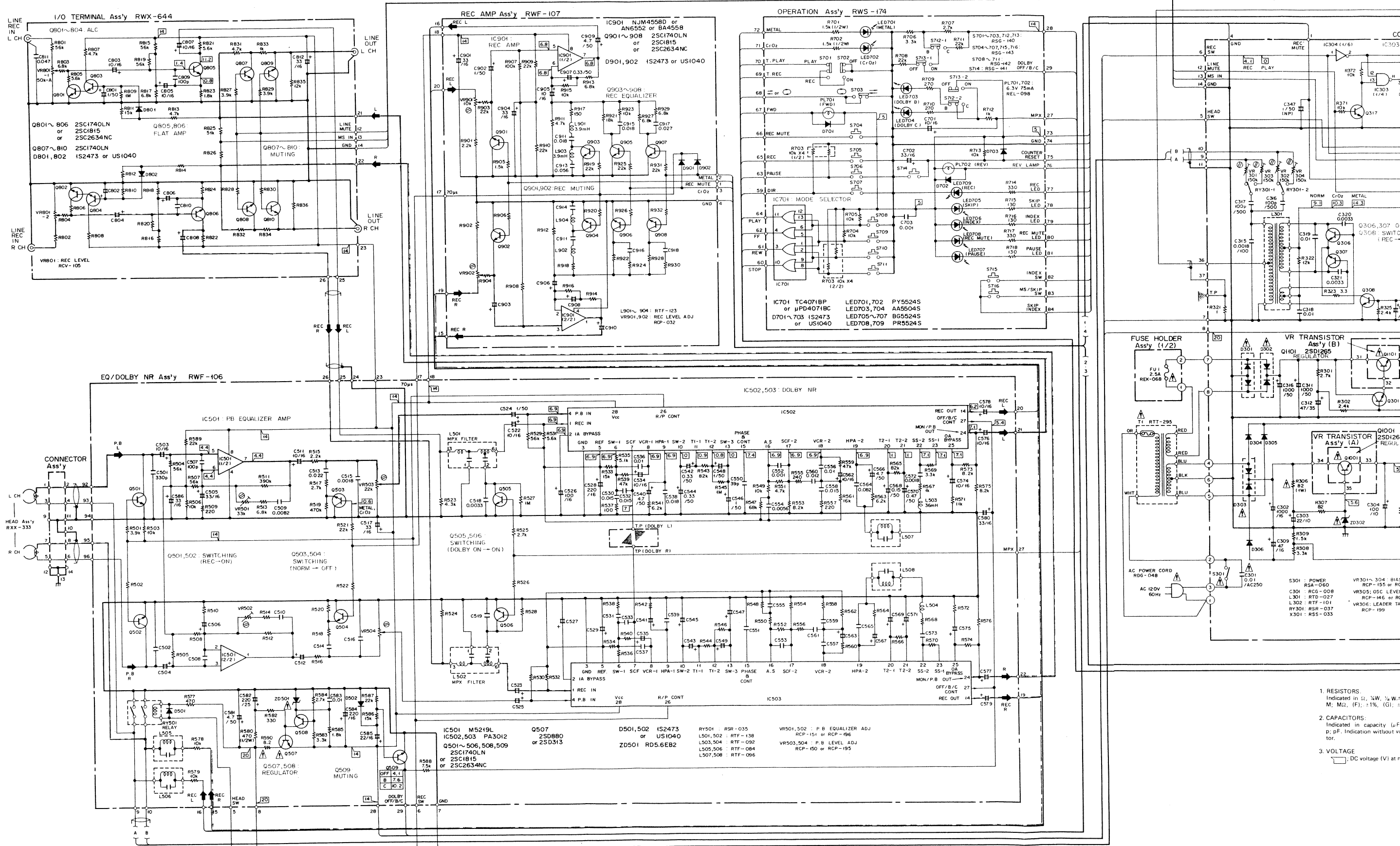
9. SCHEMATIC DIAGRAM

A

B

C

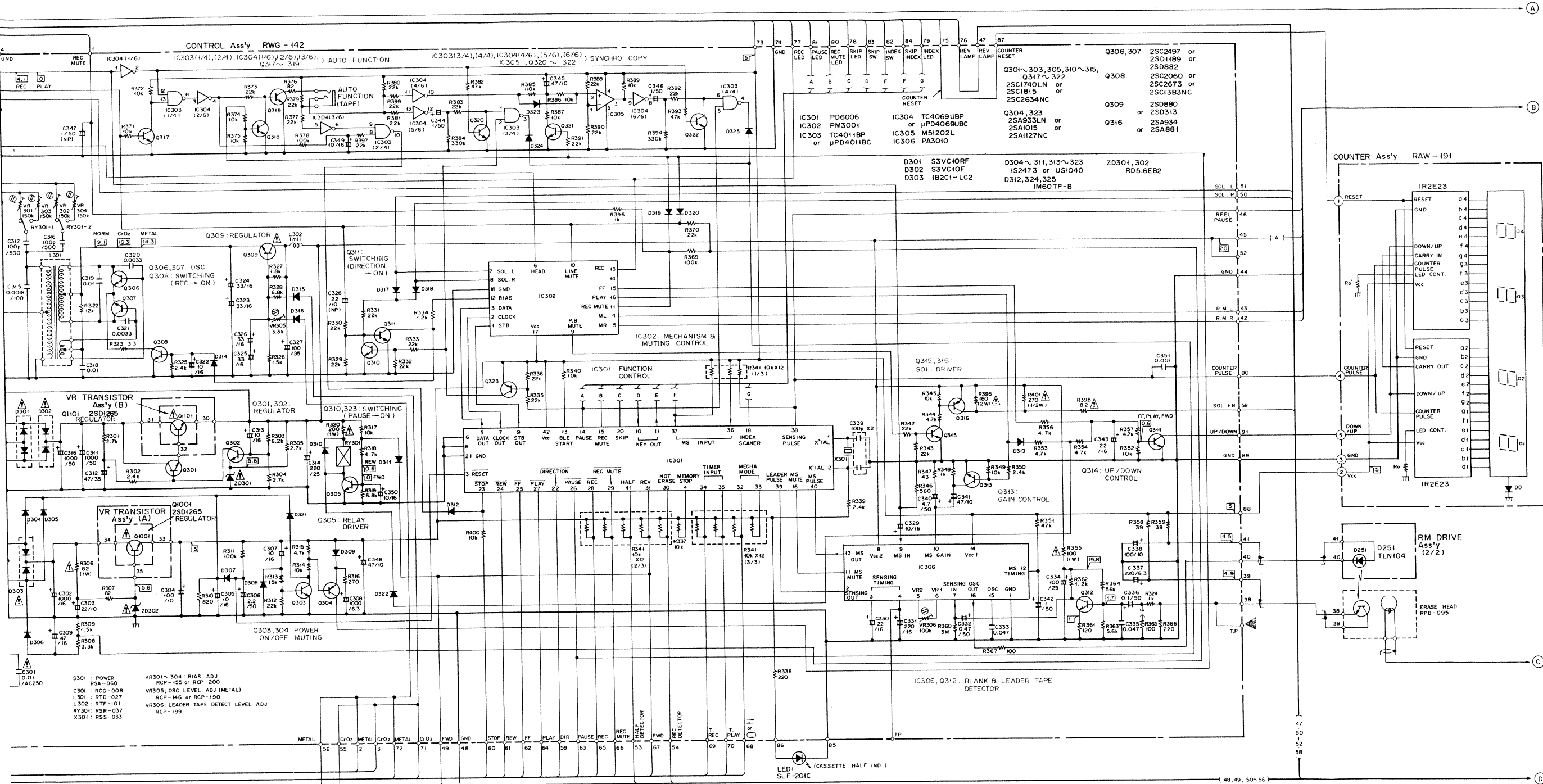
D



- 1. RESISTORS.
Indicated in Ω , $\frac{1}{2}W$, $\frac{1}{4}W$, $\frac{1}{8}W$, $\frac{1}{16}W$, $\frac{1}{32}W$, $\frac{1}{64}W$, $\frac{1}{128}W$, $\frac{1}{256}W$, $\frac{1}{512}W$, $\frac{1}{1024}W$, $\frac{1}{2048}W$, $\frac{1}{4096}W$, $\frac{1}{8192}W$, $\frac{1}{16384}W$, $\frac{1}{32768}W$, $\frac{1}{65536}W$, $\frac{1}{131072}W$, $\frac{1}{262144}W$, $\frac{1}{524288}W$, $\frac{1}{1048576}W$, $\frac{1}{2097152}W$, $\frac{1}{4194304}W$, $\frac{1}{8388608}W$, $\frac{1}{16777216}W$, $\frac{1}{33554432}W$, $\frac{1}{67108864}W$, $\frac{1}{134217728}W$, $\frac{1}{268435456}W$, $\frac{1}{536870912}W$, $\frac{1}{1073741824}W$, $\frac{1}{2147483648}W$, $\frac{1}{4294967296}W$, $\frac{1}{8589934592}W$, $\frac{1}{17179869184}W$, $\frac{1}{34359738368}W$, $\frac{1}{68719476736}W$, $\frac{1}{137438953472}W$, $\frac{1}{274877906944}W$, $\frac{1}{549755813888}W$, $\frac{1}{1099511627776}W$, $\frac{1}{2199023255552}W$, $\frac{1}{4398046511104}W$, $\frac{1}{8796093022208}W$, $\frac{1}{17592186044416}W$, 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$\frac{1}{168499668717691498716668844293872531710232152640878575295186075648}W$, $\frac{1}{336999337435382997433337688587745063420464305281757150590372151296}W$, $\frac{1}{673998674870765994866675377175490126840928610563514301180744302592}W$, $\frac{1}{1347997349741531989733350754350980253681857221127028602361488605184}W$, $\frac{1}{2695994699483063979466701508701960507363714442254057204722977210368}W$, $\frac{1}{5391989398966127958933403017403921014727428884508114409445954420736}W$, $\frac{1}{10783978797932255917866806034807842029454857769016228818891088411472}W$, $\frac{1}{21567957595864511835733612069615684058909715538032457637782176822944}W$, $\frac{1}{43135915191729023671467224139231368117819431076064915275564353645888}W$, $\frac{1}{86271830383458047342934448278462736235638862152129830551128707291776}W$, $\frac{1}{172543660766916094685868896556925472471277724304259661102257414583552}W$, $\frac{1}{345087321533832189371737793113850944942555448608519322204514829167104}W$, $\frac{1}{690174643067664378743475586227701889885110897217038644409029658334208}W$, $\frac{1}{1380349286135328757486951172455403779770221794434077288818059316668416}W$, $\frac{1}{2760698572270657514973902344910807559540443588868154577636118633336832}W$, $\frac{1}{5521397144541315029947804689821615119080887177736309155272237266673664}W$, $\frac{1}{11042794289082630059895609379643230238161774355472618310544474533347328}W$, $\frac{1}{22085588578165260119791218759286460476323548710945236621088949066694656}W$, $\frac{1}{44171177156330520239582437518572920952647097421890473242177898133389312}W$, $\frac{1}{88342354312661040479164875037145841905294194843780946484355796266778624}W$, $\frac{1}{176684708625322080958329750074291683810588389687561892968711592533557248}W$, $\frac{1}{353369417250644161916659500148583367621176779375123785937423185067114496}W$, $\frac{1}{70673883450128832383331900029716673524235355875024757187484637013422912}W$, $\frac{1}{141347766900257664666663$

NOTE:

The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



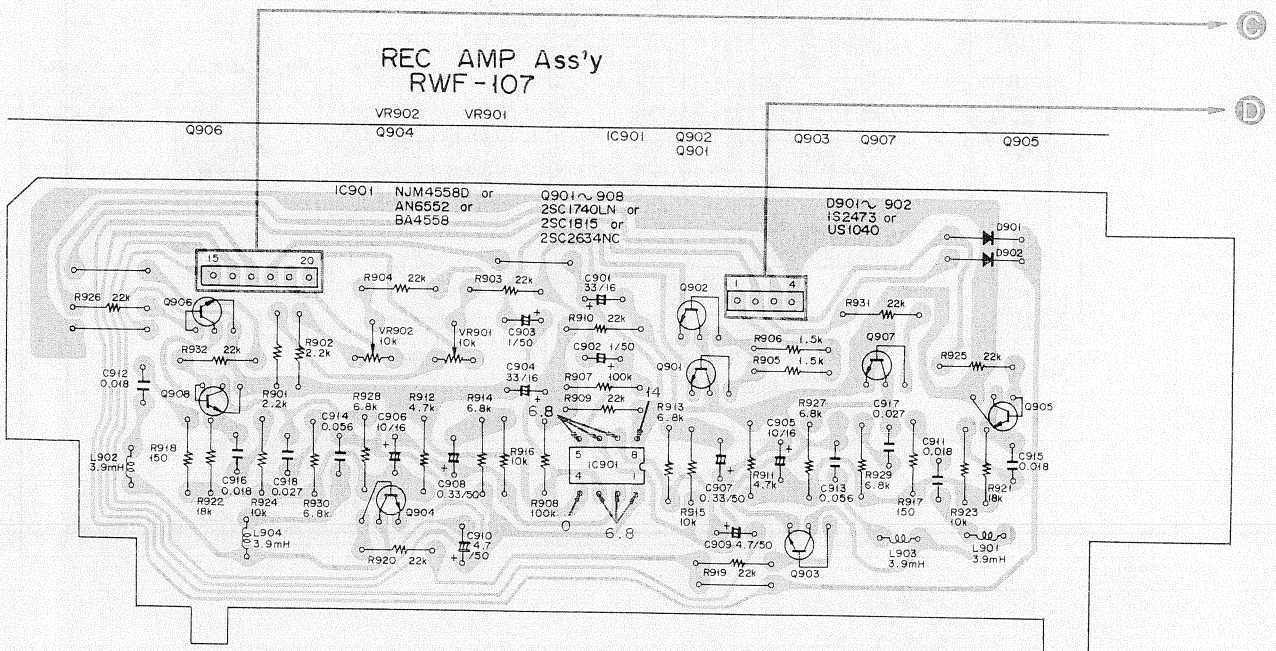
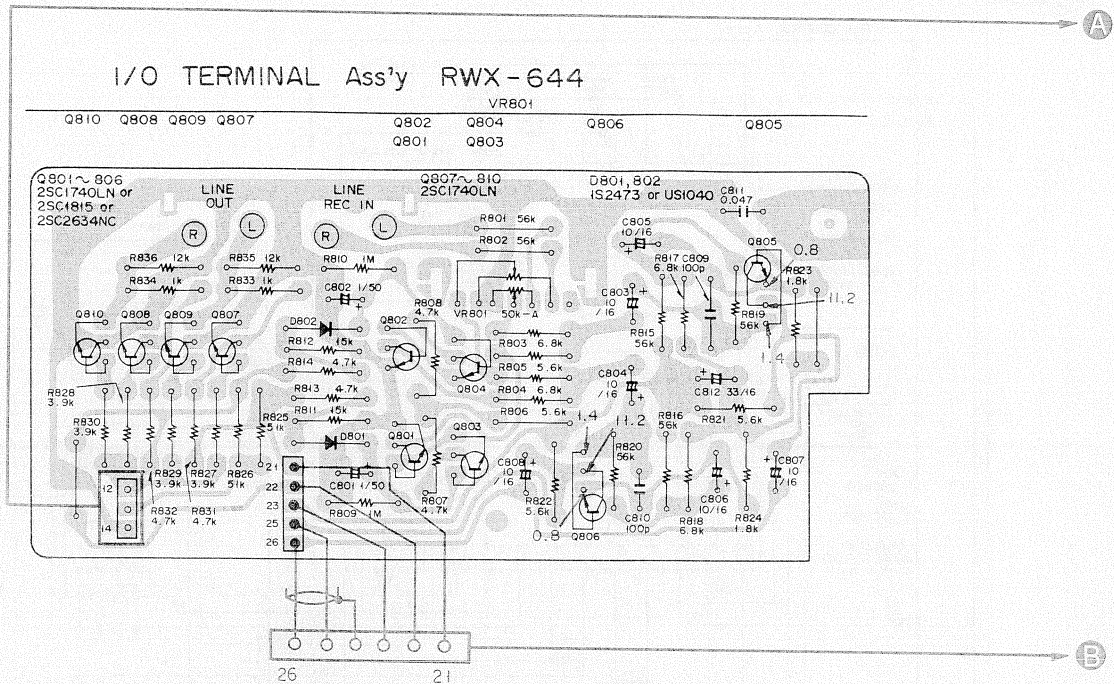


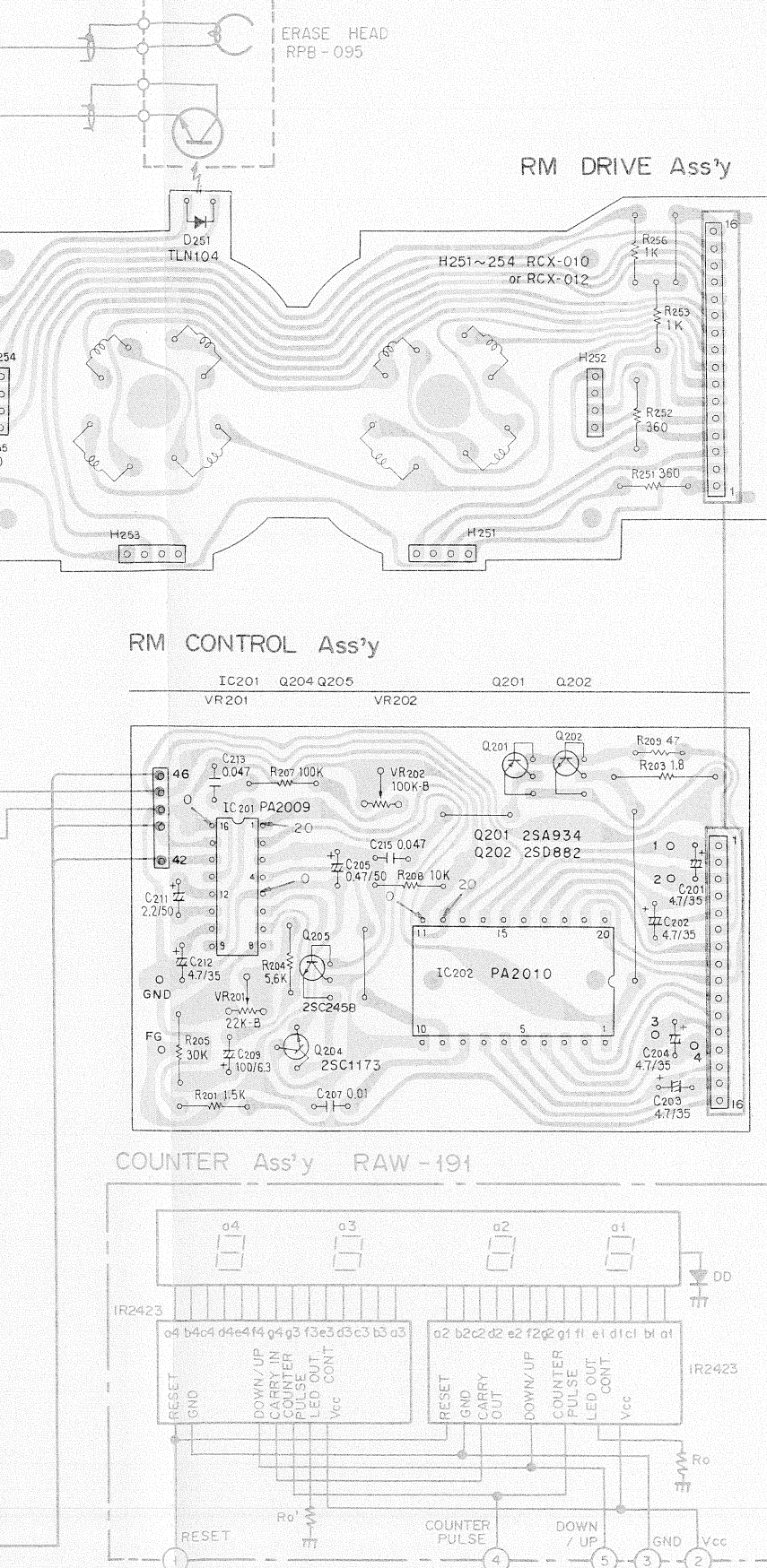
SWITCH CONTROL Assy

SI01: CASSETTE HALF DETECTOR NO HALF - HALF
SI02: ERASE PREVENT DETECTOR (FWD) NO HOLE - HOLE
SI03: FWD / REV SELECTOR FWD - REV
SI04: ERASE PREVENT DETECTOR (REV) NO HOLE - HOLE
SI05: AUTO TAPE SELECTOR NORM - CrO2
SI06: AUTO TAPE SELECTOR CrO2 - METAL

The underlined indicates the switch position

10. P.C. BOARDS CONNECTION DIAGRAM





CONTROL Ass'y
RWG-142

VR TRANSISTOR
Ass'y (B)

CM CONTROL Ass'y

OPERATION Ass'y
RWS-174

RM DRIVE Ass'y

RM CONTROL Ass'y

COUNTER Ass'y RAW-191

VR TRANSISTOR
Ass'y (A)

FUSE HOLDER
Ass'y

OTHERS

Mark	Part No.	Symbol & Description
⚠ ★★	RSA-060	S301 Push switch (POWER)
	RTD-027	L301 Osc. coil
	RTF-101	L302 Line coil
★★	RSR-037	RY301 Relay
★	RSS-033	X301 Crystal resonator (with C339)
	RKP-310	CN306 Connector socket S 12-P
	RKP-312	CN307 Connector socket S 14-P
	RKP-681	CN308 Connector assembly 12-P
	RKP-680	CN309 Connector assembly 5-P
	RKP-648	CN310 Connector assembly 5-P
	RKP-657	CN311 Connector assembly 4-P
	RKP-658	CN312 Connector assembly 4-P
	RKP-656	CN313 Connector assembly 3-P
	RKP-660	CN314 Connector 3-P
	RKP-661	CN315 Connector 3-P
	RKN-083	Phone Jack 3-P (AUTO FUNCTION)
	RNH-209	Shield case 14 x 14

REC Amplifier Assembly (RWF-107)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	NJM4558D (AN6552) (BA4558)	IC901
★★	2SC1740LN (2SC1815) (2SC2634NC)	Q901—Q908
★	1S2473 (US1040)	D901, D902

COILS

Mark	Part No.	Symbol & Description
	RTF-123	L901—L904 Coil 3.9mH

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 330M 16	C901, C904
	CEA R33M 50	C907, C908
	CEA 010M 50	C902, C903
	CEA 4R7M 50	C909, C910
	CEA 100M 16	C905, C906
	CQMA 183J 50	C911, C912, C915, C916
	CQMA 273J 50	C917, C918
	CQMA 563K 50	C913, C914

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
★	RCP-032 RD¼PM □□□ J	VR901, VR902 Semi-fixed (10k-B) R901—R932

VR Transistor Assembly A

Mark	Part No.	Symbol & Description
⚠ ★★	2SD1265	Q1001 Transistor

VR Transistor Assembly B

Mark	Part No.	Symbol & Description
⚠ ★★	2SD1265	Q1101 Transistor

12. ADJUSTMENTS

12.1 MECHANICAL ADJUSTMENTS

12.1.1 Pinch roller pressure adjustment

1. Set to forward direction, and switch to playback mode without loading a cassette half.
2. Using a tension gauge as shown in Fig. 12-1, gently press against the pinch roller arm. The tension gauge reading should lie between 250g and 400g at the moment that the pinch roller is separated from the capstan, and the capstan stops rotating.
3. If the reading lies outside the above range, replace the pinch roller pressure spring.
4. Set to reverse direction and measure the pinch roller pressure for the pinch roller on the other side in the same way as described above.

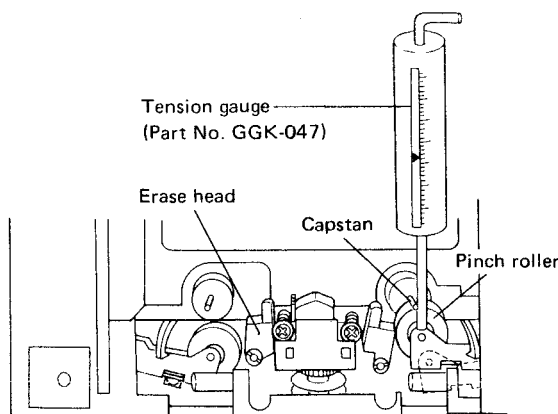


Fig. 12-1 Pinch roller pressure adjustment

12.1.2 Preliminary azimuth adjustment

1. Set to forward direction, and switch to stop mode.
2. Using a screwdriver as shown in Fig. 12-2, adjust gap A between the housing and the revolving base to 1.5mm by turning screw ①.
3. Set to reverse direction.
4. Using the screwdriver again, adjust gap B between the housing and the revolving base to 1.5mm by turning screw ②.

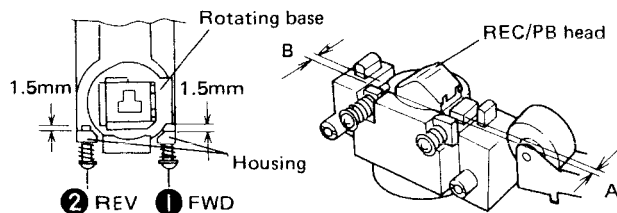


Fig. 12-2 Azimuth adjustment point

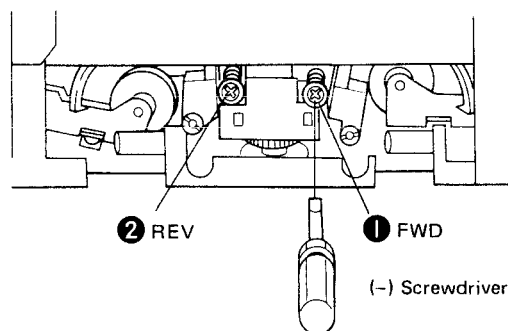


Fig. 12-3 Azimuth preadjustment

12.1.3 Tape travel adjustment

1. Set to forward direction, load a mirror-equipped cassette, and switch to playback mode.
2. Adjust nut ① to ensure that no tape curling occurs in the guide section of the recording and erase heads as shown in Fig. 12-4.
3. Set to reverse direction.
4. Adjust nut ② to ensure that no tape curling occurs in the guide section of the recording and dummy heads.
5. Check that there is no tape curling during repeated forward and reverse tape travel.

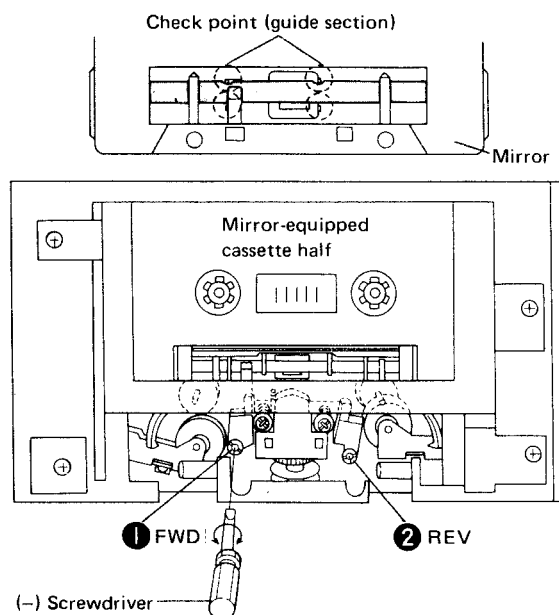


Fig. 12-4 Tape travel adjustment

12.1.4 Fast forward and rewind rotational speed adjustment

1. Connect a frequency counter between the FG and GND terminals on the reel motor control ass'y (see Fig. 12-5).
2. Set to forward direction, and switch to fast forward mode.
3. Adjust the frequency counter reading to $72\text{Hz} \pm 2\text{Hz}$ by means of VR202.
4. Switch to rewind mode, and check that the frequency counter reading lies in the $72\text{Hz} \pm 5\text{Hz}$ range.

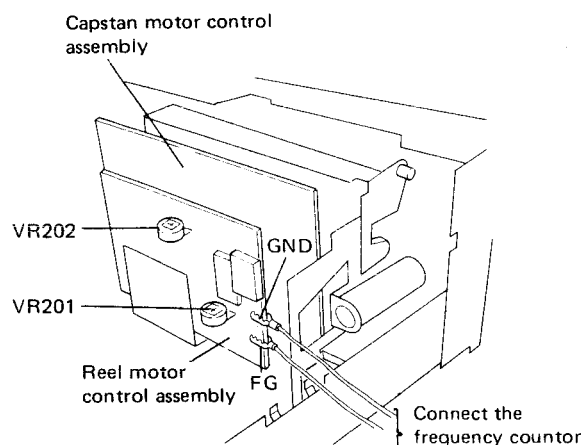


Fig. 12-5 FF/REW Rotating speed adjustment

12.1.5 Playback mode winding torque adjustment

1. Set to forward direction, mount a cassette-type torque meter, and switch to playback mode.
2. Adjust the winding torque to $45\text{g.cm} \pm 5\text{g.cm}$ by VR201.
3. Set to reverse direction.
4. Check that the winding torque is $45\text{g.cm} \pm 10\text{g.cm}$.

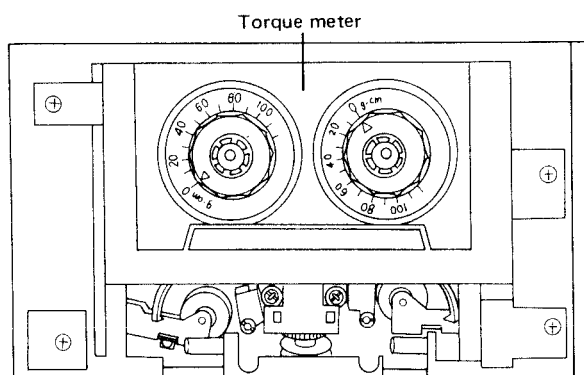


Fig. 12-6 Take-up torque adjustment

12.1.6 Tape speed adjustment

1. Connect the frequency counter to the OUTPUT terminals.
2. Set to forward direction, load a STD-301 test tape wound to the start of the tape, and switch to playback mode.
3. Adjust the frequency counter reading to $3005\text{Hz} \pm 10\text{Hz}$ by VR101.
4. Set to reverse direction, wind the test tape to the start of the tape, and switch to playback mode.
5. Check that the frequency counter reading lies within the $3005\text{Hz} \pm 20\text{Hz}$ range.

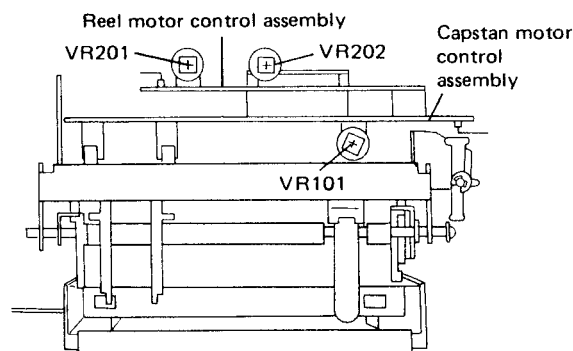


Fig. 12-7 Tape speed adjustment

12.1.7 Fast travel torque check

1. Set to forward direction, mount a cassette-type torque meter, and switch to fast forward mode.
2. Check that the fast forward torque is within the $100\text{g.cm} \pm 30\text{g.cm}$ range.
3. Switch the mode to rewind, and again check that the rewind torque lies within the $100\text{g.cm} \pm 30\text{g.cm}$ range.

12.1.8 Back-tension torque check

1. Set to forward direction, mount a cassette-type torque meter, and switch to playback mode.
2. Check that the supply reel back-tension lies within the $3.5\text{g.cm} \pm 1.5\text{g.cm}$ range.
3. Reverse the direction.
4. Check that the supply reel back-tension again lies within the $3.5\text{g.cm} \pm 1.5\text{g.cm}$ range.

12.2 ELECTRICAL ADJUSTMENTS

- Check the following points before starting any electrical adjustments.

1. All mechanical adjustments must be completed.
2. Clean the heads and demagnetize the REC/PB head.
3. Level measurements are based on $0\text{dBv} = 1\text{V}$. Connect a $50\text{k}\Omega$ dummy resistor ($47\text{k}\sim 52\text{k}\Omega$) across the OUTPUT terminals.
4. Use the specified test tapes for each adjustment. Although test tapes have both A and B sides, use the side with the label (side A).

STD-341A : Playback adjustments

STD-608A : NORMAL blank tape

STD-603 : CrO_2 blank tape

STD-604 : METAL blank tape

5. Prepare the following measuring equipment. AC millivoltmeter, audio oscillator, attenuator, and oscilloscope.
6. Unless otherwise specified, always adjust for both left and right channels.
7. Unless otherwise specified, adjust with the DOLBY NR switch in the OFF position.
8. Let the deck warm up for a few minutes before starting adjustments. Also leave the deck in playback and recording mode respectively for 3 to 5 minutes before starting playback and recording frequency response adjustments.

9. Proceed according to the specified adjustment sequence. Changing the sequence can prevent proper adjustments from being carried out, and subsequently result in loss of performance.

Adjustment sequence

1. Head azimuth
2. Tape travel check
3. Playback equalization
4. Playback level
5. Erase current
6. Record/playback frequency response
7. Recording level
8. Leader tape detect
9. Limiter effect check

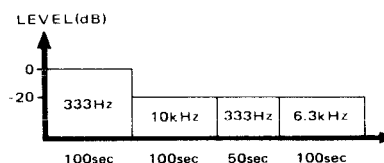


Fig. 12-8 STD-341A test tape

12.2.1 Head Azimuth Adjustment

Settings

AC mV meter Connect to OUTPUT terminals
 Test tape STD-341A (10kHz, -20dB)
 Direction switch Forward
 Mode Playback
 VR503 and VR504 ... Turn clockwise to maximum position

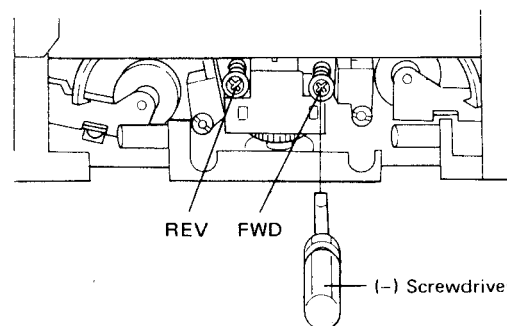


Fig. 12-10 Head azimuth adjustment

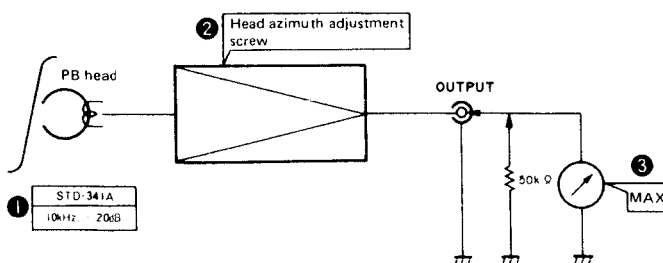


Fig. 12-9 Head azimuth adjustment

1. Turn the forward direction head azimuth adjustment screw to obtain maximum reading in the AC mV meter.
2. Reverse the direction, and turn the reverse direction head azimuth adjustment screw to again obtain maximum reading in the AC mV meter.

11. ELECTRICAL PARTS LIST

NOTES:

- When ordering resistors, first convert resistance values into code form as shown in the following examples.
 Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).
 560Ω 56 × 10¹ 561 RD4PS 561 J
 47kΩ 47 × 10³ 473 RD4PS 473 J
 0.5Ω 0R5 RN2H 0R5 K
 1Ω 010 RS1P 010 K
 Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).
 5.62kΩ 562 × 100 5621 RN4SR 5621 F
 The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 For your Parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.
 $\star\star$ GENERALLY MOVES FASTER THAN $\star$.
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Part No.	Symbol & Description
	RWG-142	Control assembly
	RWF-107	REC amplifier assembly
	RWF-106	EQ/DOLBY NR assembly
	RWS-174	Operation assembly
	RWX-644	I/O terminal assembly
	RWX-654	CM control assembly
	No supply	VR transistor assembly A
	No supply	VR transistor assembly B
	No supply	Fuse holder assembly
	No supply	RM drive assembly A
	No supply	RM control assembly B

OTHERS

Mark	Part No.	Symbol & Description
Δ $\star\star$	REK-068	FU1 Fuse (2.5A)
Δ $\star\star$	REK-051	FU2 Fuse (1A)
Δ $\star$	RTT-295	T1 Power transformer
Δ	RDG-048	AC Power cord
$\star$	SLF-201C	LED1 LED
$\star\star$	RAW-191	Tape counter assembly
$\star\star$	RXX-333	Head assembly (REC/PB head)
$\star$	RPB-094	Erase head
$\star$	RPB-095	Erase head with photo sensor
Δ $\star$	RXP-111	Plunger solenoid
	RXX-334	FG coil assembly
	RXX-363	Reel motor assembly B II (RM drive assembly A, Reel shaft, Reel motor coil, Hall device)

Mark	Part No.	Symbol & Description
	RXX-394	Reel motor full assembly V (RM control assembly B, RM drive assembly A, Reel shaft, Reel motor coil, Hall device)

EQ/DOLBY NR Assembly (RWF-106)

SEMICONDUCTOR

Mark	Part No.	Symbol & Description
$\star\star$	M5219L	IC501
$\star\star$	PA3012	IC502, IC503
$\star\star$	2SC1740LN (2SC1815)	Q501—Q506, Q508, Q509
	(2SC2634NC)	
$\star\star$	2SD880 (2SD313)	Q507
$\star$	1S2473 (US1040)	D501, D502
$\star$	RD5.6EB2	ZD501

CAPACITORS

Mark	Part No.	Symbol Description
	CQSH 331K 50	C501, C502
	CEA R15M 50	C568, C569
	CEA R33M 50	C542—C545
	CEA R47M 50	C570, C571
	CEA 4R7M 50	C540, C541, C566, C567, C581
	CEA 010M 50	C546—C549
	CEA 221M 25	C582
	CEANL 100M 16	C503, C504, C534, C535, C562, C563
	CEANL 330M 16	C505, C506
	CEA 100M 16	C511, C512, C522, C523, C574— C579

Mark	Part No.	Symbol & Description
	CEANL 010M 50	C524, C525
	CEA 220M 16	C585
	CEA 330M 16	C517, C580, C586
	CEA 101M 16	C526, C527
	CEA 221M 16	C528, C529, C584
	CQMA 102K 50	C552, C553
	CQMA 182K 50	C515, C516, C572, C573
	CQMA 332K 50	C518, C519
	CQMA 562K 50	C554, C555
	CQMA 103K 50	C536, C537, C556, C557
	CQMA 123K 50	C560, C561
	CQMA 153K 50	C530—C533, C558, C559
	CQMA 183K 50	C538, C539
	CQMA 223K 50	C513, C514
	CQMA 823K 50	C564, C565
	CQMA 822K 50	C509, C510
	CCPSL 390J 50	C550, C551
	CCPSL 101J 50	C507, C508
	CKDYF 103Z 50	C583

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
$\star$	RCP-151 (RCP-196)	VR501, VR502 Semi-fixed (33k-B)
$\star$	RCP-150 (RCP-195)	VR503, VR504 Semi-fixed (22k-B)
Δ	RD4PM 394JNL	R511, R512
	RD1/8PM 8R2J	R590
	RD4PMF 471J	R580
	RD4PM $\square\square\square$ J	Other resistors

OTHERS

Mark	Part No.	Symbol & Description
$\star\star$	RSR-035	RY501 Reed relay
	RTF-138	L501, L502 MPX filter
	RTF-092	L503, L504 Coil 36mH
	RTF-084	L505, L506 Trap coil
	RTF-096	L507, L508 Trap coil
	RKP-649	Connector assembly 6-P

Operation Assembly (RWS-174)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
$\star\star$	TC4071BP (μ PD4071BC)	IC701
$\star$	1S2473 (US1040)	D701—D703
$\star$	PY5524S	LED701, LED702

Mark	Part No.	Symbol & Description
$\star$	BG5524S	LED705—LED707
$\star$	PR5524S	LED708, LED709
$\star$	AA5504S	LED703, LED704

SWITCHES

Mark	Part No.	Symbol & Description
$\star\star$	RSG-140	S701—S703, S712, S713 Push switch
$\star\star$	RSG-142	S708—S711 Push switch
$\star\star$	RSG-143	S704—S707, S715, S716 Push switch
$\star\star$	RSG-141	S714 Push switch

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 100M 16	C701
	CEA 330M 16	C702
	CKPYB 102K 50	C703

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
	RD4PMF 152J	R701, R702
	RM4-103J (B)	R703 Resistor array
	RD4PM $\square\square\square$ J	Other resistors

OTHERS

Mark	Part No.	Symbol & Description
$\star\star$	REL-098	PL701, PL702 Lamp (DIRECTION)
	RKP-650	CN703 Connector assembly 3-P

I/O Terminal Assembly (RWX-644)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
$\star\star$	2SC1740LN (2SC1815)	Q801—Q806
	(2SC2634NC)	
$\star\star$	2SC1740LN	Q807—Q810
$\star$	1S2473 (US1040)	D801, D802

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 010M 50	C801, C802
	CEA 100M 16	C803—C808
	CEA 330M 16	C812
	CCPSL 101J 50	C809, C810
	CKDYF 473Z 50	C811

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
★	RCV-105 RD%PM □□□J	VR801 Variable (INPUT) R801—R836

OTHERS

Mark	Part No.	Symbol & Description
	RKB-019 RKP-652 RKP-655	Terminal (INPUT/OUTPUT) CN801 Connector assembly 6-P CN802 Connector assembly 3-P

RM Control Assembly B

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PA2009	IC201
★★	PA2010	IC202
★★	2SA934 (2SA881)	Q201
★★	2SD882 (2SC2497-R) (2SD1189)	Q202
★★	2SC2458	Q205
★★	2SC1173	Q204

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 4R7M 35 CEA R47M 50 CEA 2R2M 50 CEA 101M 6R3 CEA 4R7M 35	C201, C204, C212 C205 C211 C209 C202, C203
	CQMA 473K 50 CKDYF 103Z 50 CKDYF 473Z 50	C213 C207 C215

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
★	RCP-009	VR201 Semi-fixed (22k-B)
★	RCP-056 RD%PM □□□J RD%PS 1R8J	VR202 Semi-fixed (100k-B) R201, R204, R205, R207, R209 R203

OTHERS

Mark	Part No.	Symbol & Description
	REE-051 RKH-005 RBA-026	Spacer Transistor holder Screw

RM Drive Assembly A

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★	RCX-010 (RCX-012)	H251—H254 Hall device A (Hall device C)
★	TLN-104	D251

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
	RD%PM □□□J	R251—R253, R255, R256

CM Control Assembly (RWX-654)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PA2011	IC101
★★	PA2012	IC102
★★	2SC1815 (2SC2634NC) (2SC1740LN)	Q101, Q102
★★	2SA934	Q104
★★	2SD882 (2SC2497-R) (2SD1189)	Q103
★	W03B (W03C)	D101, D102
★	1S2473 (US1040)	D103, D104
★	RCX-010 (RCX-012)	H101, H102 Hall device A (Hall device C)

SWITCHES

Mark	Part No.	Symbol & Description
★★	RSG-116	S101, S102, S104—S106 Push switch
★★	RSH-063	S103 Slide switch

CAPACITORS

Mark	Part No.	Symbol & Description
	RCE-229 CEA R47M 50 CEA 100M 16 CEA 100M 25 CQMA 273K 50	C101 Film (0.0027) C107, C109, C110 C104, C106 C111 C102

Mark	Part No.	Symbol & Description
	RCE-228 CKDYF 102Z 50 CKDYF 103Z 50	C103 Film (0.0082) C105 C108, C112

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
★	RCP-117 RN%PQ 203F RD%PS 2R7J RD%PM □□□J	VR101 Semi-fixed (15k-B) R100 R111 Other resistors

Control Assembly (RWG-142)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PD6006	IC301
★★	PM3001	IC302
★★	PA3010	IC306
★★	M51202L	IC305
★★	TC4011BP (μPD4011BC)	IC303
★★	TC4069UBP (μPD4069UBC)	IC304
★★	2SC1740LN (2SC1815) (2SC2634NC)	Q301—Q303, Q305, Q310—Q315, Q317—Q322
★★	2SA933LN (2SA1015) (2SA1127NC)	Q304, Q323
★★	2SC2497-R (2SD1189) (2SD882)	Q306, Q307
★★	2SC2060 (2SC2673) (2SC1383NC)	Q308
⚠	★★ 2SD880 (2SD313)	Q309
★★	2SA934 (2SA881)	Q316
⚠	★ S3VC10RF ★ 1S2473 (US1040)	D301 D304—D311, D313—D323
⚠	★ 1M60 ★ S3VC10F ⚠ 1B2C1-LC2 ★ RD5.6EB2	D312, D324, D325 D302 D303 ZD301, ZD302

CAPACITORS

Mark	Part No.	Symbol & Description
⚠	RCG-008 CEA 221M 6R3 CEA 102M 6R3 CEANP 220M 10 CEANL 470M 10	C301 (0.01/AC250V) C337 C308 C328 C345
	CEA 220M 10 CEA 470M 10 CEA 101M 10 CEA 100M 16	C303 C341, C348 C304, C338 C305, C307, C313, C322, C329, C349, C350
	CEA 220M 16 CEA 330M 16 CEA 470M 16 CEA 221M 16 CEA 102M 16	C330, C343 C323—C326 C309 C331 C302
	RCH-051 CEA 221M 25 CEA 470M 35 CEANP 010M 50 CEA 0R1M 50	C327 Electrolytic 100/35V C314 C312 C347 C336
	CEA R47M 50 CEA 010M 50 CEA 2R2M 50 CEA 4R7M 50 CEA 102M 50	C332 C342, C344, C346 C306 C340 C310, C311
	CQMA 332K 50 CQMA 103K 50 CQMA 473K 50 CQMA 103J 50 CQPA 182J 100	C320, C321 C318 C333 C319 C315
	CQMA 102K 50 CCDSL 101K 500 CKDYF 473Z 50 CEA 101M 25	C351 C316, C317 C335 C334

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
★	RCP-155 (RCP-200)	VR301—VR304 Semi-fixed (150k-B)
★	RCP-146 (RCP-190) RCP-199	VR305 Semi-fixed (3.3k-B) VR306 Semi-fixed (100k-B)
⚠	PM12-103J (B) RS2LF 181J ⚠ RD1/8PM 8R2J ⚠ RS1LF □□□J ⚠ RD%PMF 271J ⚠ RD%PM □□□J	R341 Resistor array R395 R398 R306, R320, R355 R401 Other resistors

- Return to the forward direction and check that there has been no change in the azimuth adjustment. If there is considerable change, readjust by repeating step 1 and 2. (Lock the screws with screw lock after completing the adjustment).

12.2.2 Tape Travel Check

Setting

Test tape Mirror-equipped cassette half
 Direction switch Forward
 Mode Playback

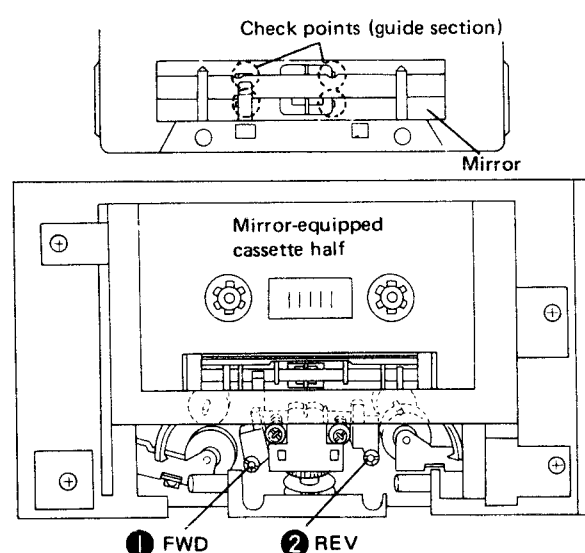


Fig. 12-11 Tape travel check

Procedure

- Check that tape curling does not occur in the guide section between the recording and erase heads.
- Reverse the direction of tape travel, and check that tape curling does not occur in the guide section between the recording and dummy heads.
- If tape curling does occur, adjust tape travel as described in section 12.1.3 on p.50, and repeat the adjustment procedures from section 12.2.1.

12.2.3 Playback Equalization Adjustment

Settings

AC mV meter Connect to OUTPUT terminals
 Test tape STD-341A (333Hz, -20dB) (6.3kHz, -20dB)
 Direction switch Forward
 Mode Playback

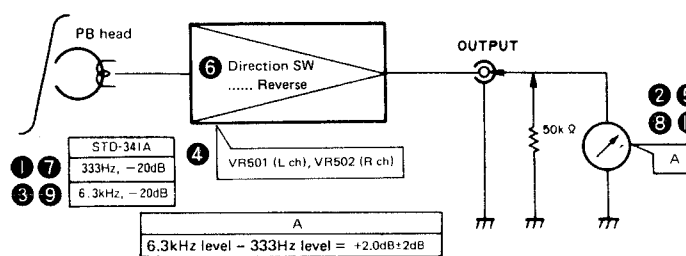


Fig. 12-12 Playback equalization adjustment

Procedure

- Play the 333Hz, -20dB portion and record the AC mV meter reading.
- Then play the 6.3kHz, -20dB portion, and adjust VR501 (L ch) and VR502 (R ch) so that the difference in the playback output signal level with 333Hz level as the reference level is +2.0dB.
- Reverse the direction, and play the test tape again as described in steps 1 and 2, checking that the output difference is no greater than +2.0dB ± 2dB.

12.2.4 Playback Level Adjustment

Since this adjustment determines the DOLBY NR level during playback, it should be performed precisely.

Settings

AC mV meter Connect to TP (DOL.L) and TP (DOL.R)
 Test tape STD-341A (333Hz, 0dB)
 Direction switch Forward
 Mode Playback

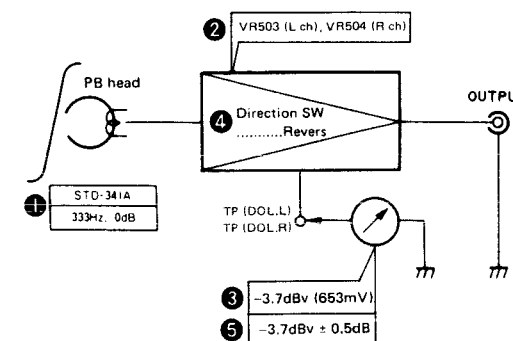


Fig. 12-13 Playback level adjustment

Procedure

- Adjust VR503 (L ch) and VR504 (R ch) so that the meter reads of -3.7dBv (653mV).
- Set to reverse direction, and check that the AC mV meter reading lies within the -3.7dBv ± 0.5dB range.
- If the reading does not lie within the specified range, check tape travel and repeat this adjustment from step 1.

12.2.5 Erase Current Adjustment

Settings

AC mV meter Connect to TP (IE)
 Test tape STD-604
 INPUT volume control Minimum level
 Direction switch Forward
 Mode Record

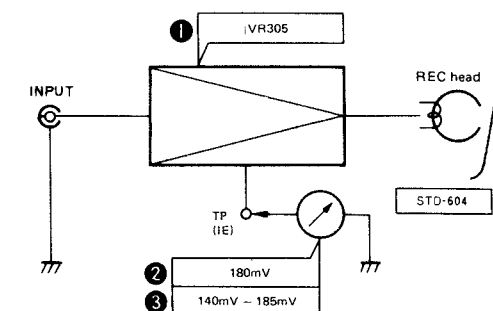


Fig. 12-14 Erase current adjustment

Procedure

- Adjust VR305 to obtain a meter reading of 180mV in the AC mV meter.
- Reverse the direction, and check that the AC mV meter reading lies within 140mV ~ 185mV.
- If the reading does not lie within the specified range, adjust VR305 on the condition that the meter reading in the both directions lie within 140mV ~ 185mV.

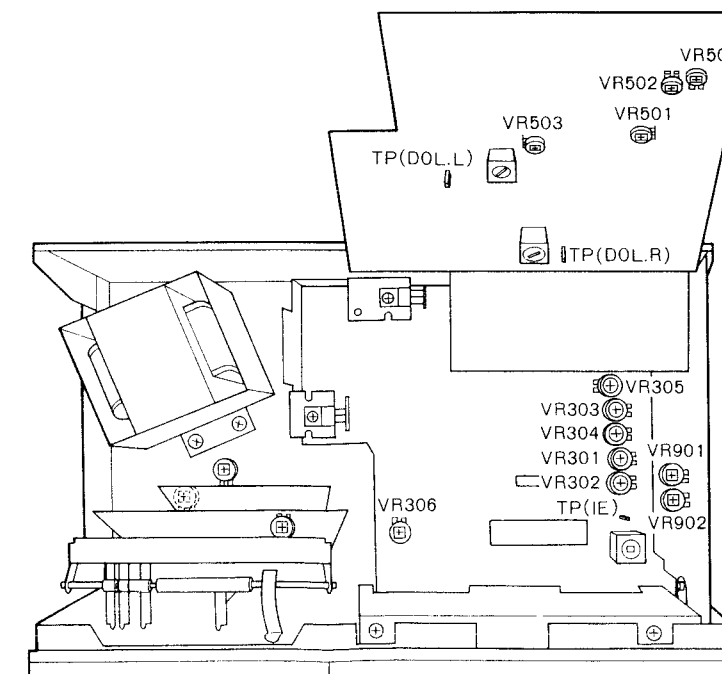


Fig. 12-15 Adjustment point

12.2.6 Record/Playback Frequency Response Adjustment

- Settings**
AC mV meter Connect to OUTPUT terminals
Input signal 333Hz, -30dBv (31.6mV) to LINE INPUT terminals
Test tape STD-608A (STD-603, STD-604)
Direction switch Forward
Mode Record

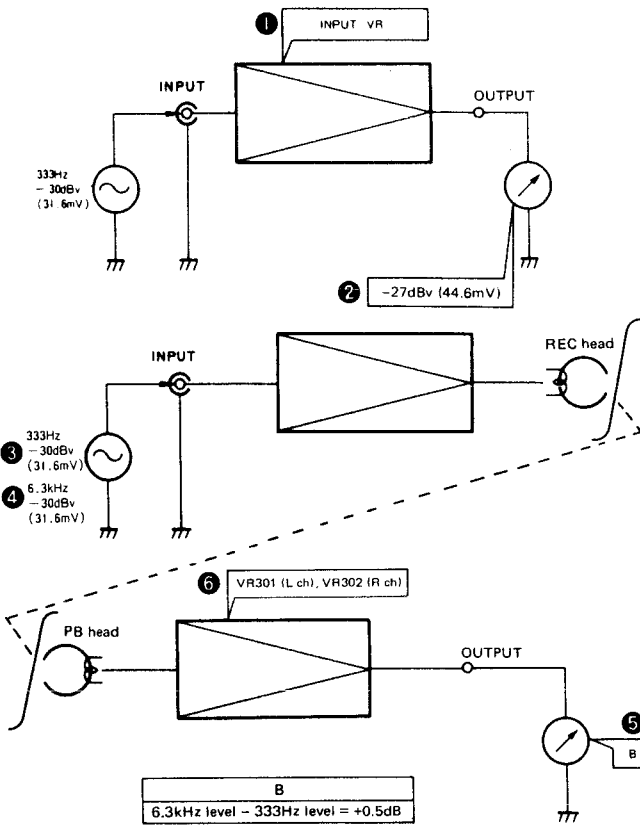


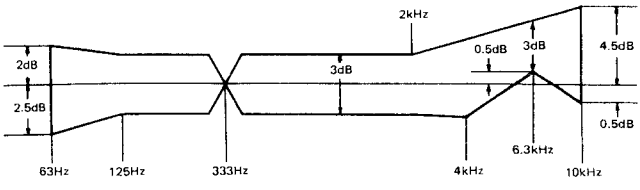
Fig. 12-16 Record/playback frequency response adjustment

- Procedure**
1. Adjust the INPUT level control so that the meter reads -27dBv (44.6mV).
 2. Record the 333Hz, -30dBv and 6.3kHz, -30dBv signals, and adjust VR301 (L ch) and VR302 (R ch) so that the difference in the playback output signal level with the 333Hz level as the reference level is +0.5dB.
 3. Change the DOLBY NR switch positions (See Fig. 12-17 and 18), and check that the frequency response is satisfactory.
 4. Likewise adjust VR303 (L ch) and VR304 (R ch) in the reverse direction.

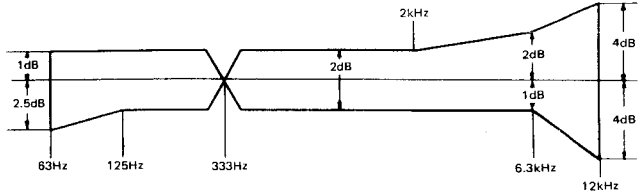
5. If the playback response is not met the specifications, adjust VR305 on the condition that TP (IE) terminal lies within 140mV~185mV, and repeat this adjustment from step 1.

Playback Frequency Response
Test tape STD-341A
DOLBY NR switch OFF

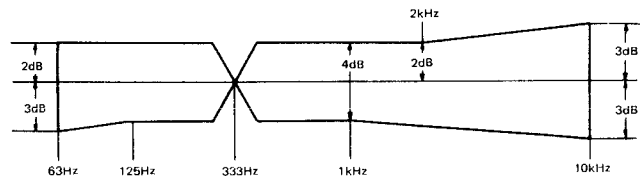
NOTE:
Due to "edge effect", compensate the right channel by -0.5dB at 125Hz and -1dB at 63Hz.



Overall Frequency Response
Test tape STD-608A
DOLBY NR switch OFF



Test tape STD-608A
DOLBY NR switch ON (B Type)



Test tape STD-608A
DOLBY NR switch ON (C Type)

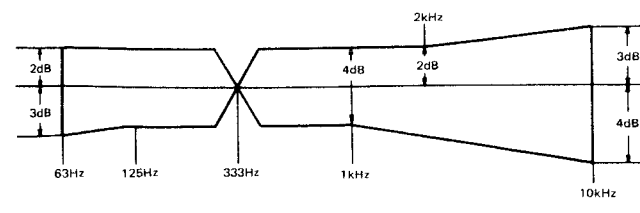
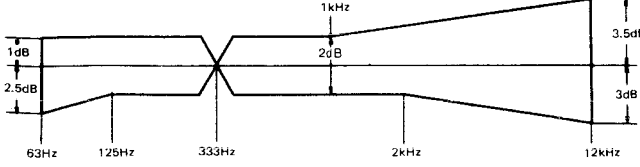
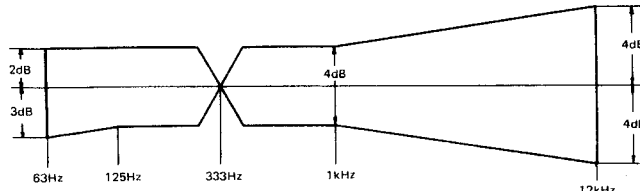


Fig. 12-17 Frequency response

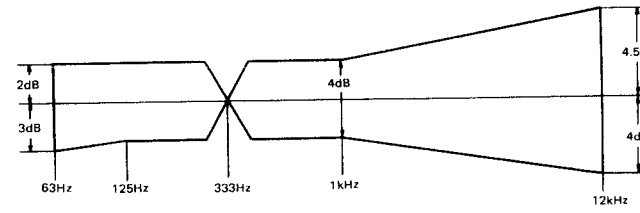
Test tape STD-603
DOLBY NR switch OFF



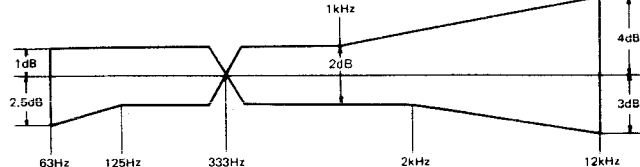
Test tape STD-603
DOLBY NR switch ON (B Type)



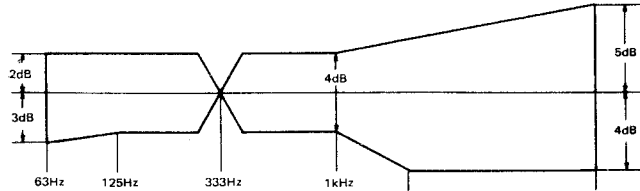
Test tape STD-603
DOLBY NR switch ON (C Type)



Test tape STD-604
DOLBY NR switch OFF



Test tape STD-604
DOLBY NR switch ON (B Type)



Test tape STD-604
DOLBY NR switch ON (C Type)

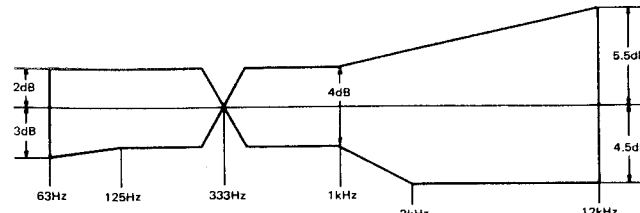


Fig. 12-18 Frequency response

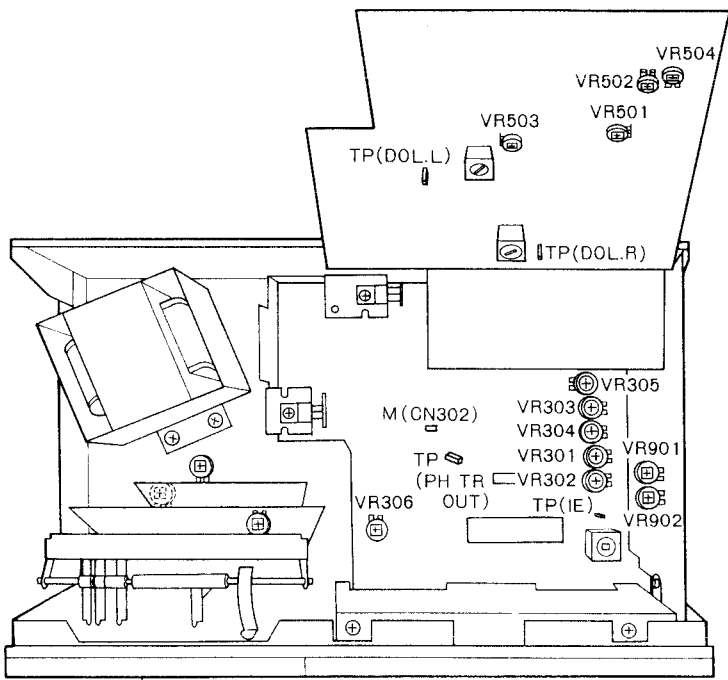


Fig. 12-19 Adjustment points

12.2.7 Recording Level Adjustment

Settings

AC mV meter Connect to TP (DOL.L) and TP (DOL.R)
 Input signal 333Hz, -10dBv (316mV) to LINE INPUT terminals
 Test tape STD-608A (STD-603, STD-604)
 Mode Record

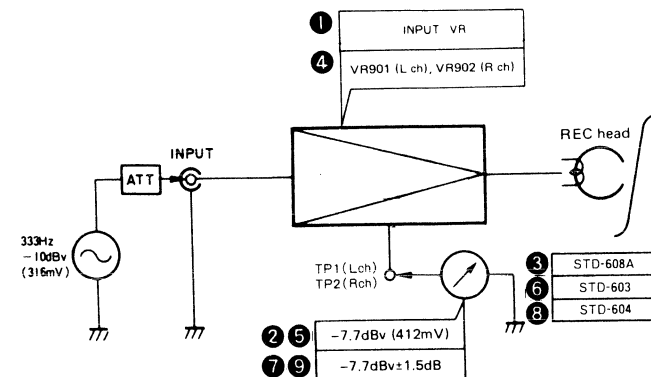


Fig. 12-20 Recording level adjustment

Procedure

1. Adjust the INPUT level control so that the meter reads -7.7dBv (412mV).
2. Set the DOLBY NR B switch to ON position.
3. Record the 333Hz, -10dBv signal on the STD-608A test tape. Then adjust VR901 (L ch) and VR902 (R ch) so that the meter reads of -7.7dBv (412mV) when the recorded signal is played back.
4. Repeat step 3 using the STD-603 test tape. The playback output level should lie within -7.7dBv±1.5dB.
5. Repeat using the STD-604 test tape. The playback output level should again lie within the -7.7dBv±1.5dB range.

12.2.8 Leader Tape Detect Adjustment

Settings 1

Input Signal 2kHz, -17dBv (0.4V P-P Sin wave) to TP (PH TR OUT) terminal
 DC mV meter Connect to pin 4 of IC306 (PA3010)

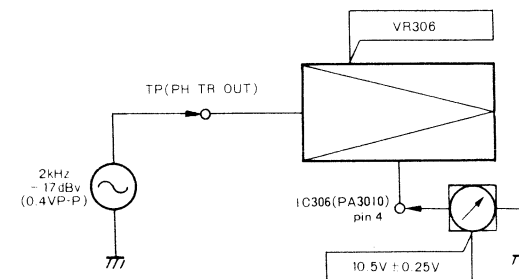


Fig. 12-21 Leader tape detect adjustment

Procedure 1

1. Remove the connector CN302 of the Control assembly.
2. Adjust the VR306 so that the DC mV meter reads 10.5V±0.25V.
3. Return the connector CN302 to the original position.

Settings 2

Mode Playback
 Tape Cassette half without tape
 Oscilloscope Connect to TP (PH TR OUT) terminal

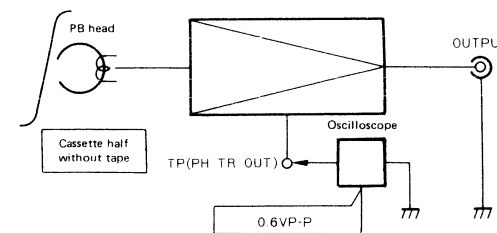


Fig. 12-22 Leader tape detect adjustment

Procedure 2

1. Confirm that the wave form is 0.6Vp-p square wave.
2. If 0.6Vp-p is exceeded, bridge the section A shown in Fig. 12-24.

12.2.9 Limiter Effect Check

Setting

Mode Record
 Input signal 333Hz, 0dBv (1V) to LINE INPUT terminal
 Test tape STD-608A
 AC mV meter Connect to LINE OUTPUT terminal
 Direction switch Forward
 INPUT level control Click position

Procedure

Check that the ACmV meter reading lies -2dBv ±1.5dB.

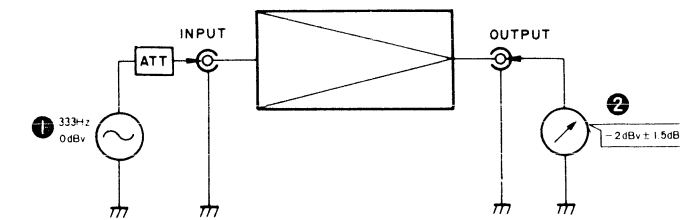


Fig. 12-23 Limiter effect check

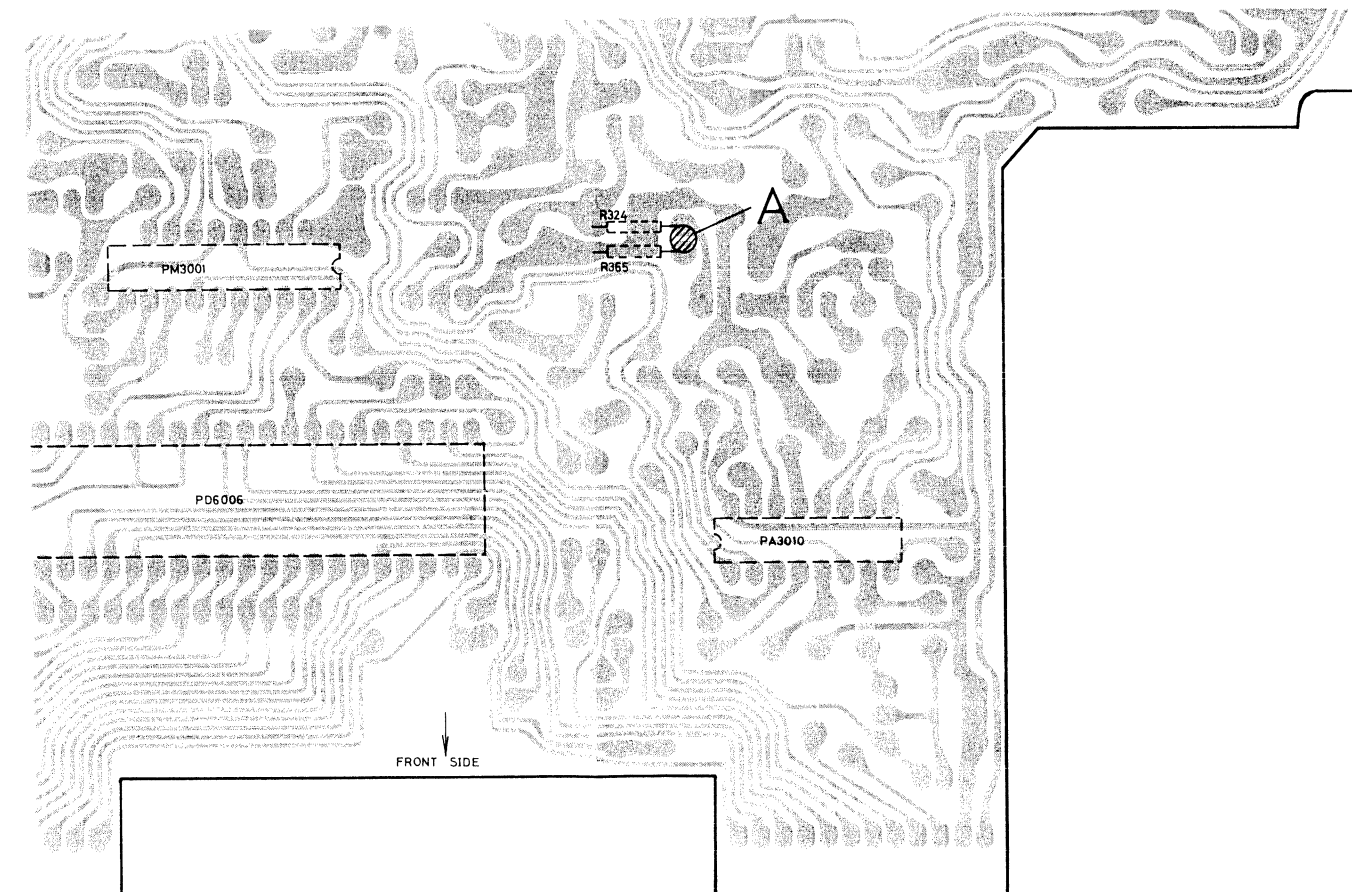


Fig. 12-24 Soldering point (Control assembly foil side)

12. RÉGLAGE

12.1 RÉGLAGES MÉCANIQUES

12.1.1 Réglage de la pression du rouleau de serrage

1. Faire marcher le magnétophone en direction avant et commuter le mode de lecture sans insérer de cassette.
2. Pousser doucement contre le bras du rouleau de serrage avec un étalon de tension comme indiqué Fig. 12-1. La lecture doit se situer entre 250 et 400gr. au moment où le rouleau de serrage est séparé du cabestan, et où le cabestan se arrêter à tourner.
3. Si la lecture se situe hors de ces limites, remplacer le ressort de serrage.
4. Faire marcher en direction opposée et mesurer la pression du rouleau de serrage de l'autre côté de la même manière que précédemment.

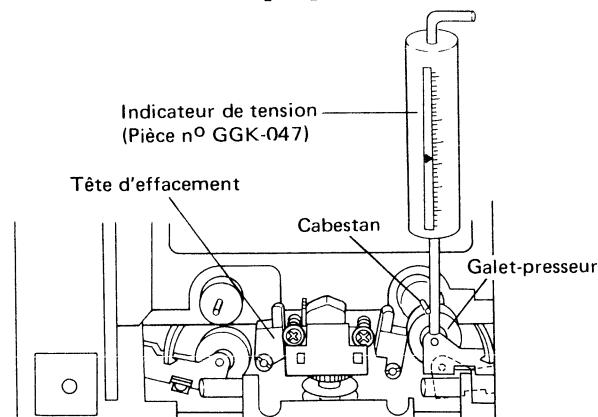


Fig. 12-1 Réglage de la pression du rouleau de serrage

12.1.2 Réglage préliminaire d'azimuth

1. Mettre en marche le magnétophone vers l'avant, en mode d'arrêt.
2. Au moyen d'un tournevis, comme il est montré Fig. 12-2 régler l'intervalle A à 1,5mm. entre le logement et la base tournante, en tournant la vis ①.
3. Faire marcher en direction inverse.
4. Au moyen du même tournevis, régler l'intervalle B à 1,5mm entre le logement et la base tournante, en tournant la vis ②.

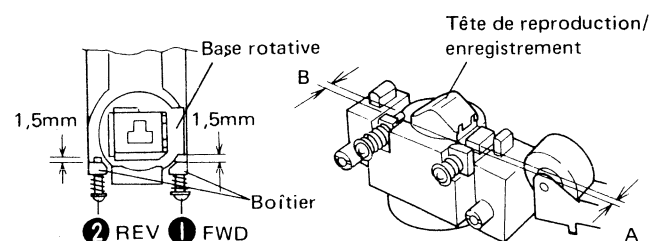


Fig. 12-2 Réglage préliminaire d'azimuth

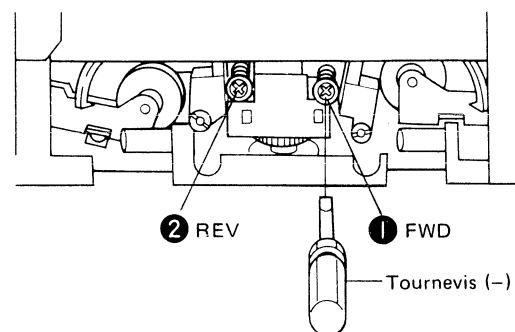


Fig. 12-3 Préréglage d'azimuth

12.1.3 Réglage du défilement de bande

1. Faire marcher en direction avant et insérer une cassette munie d'un miroir, puis commuter en mode de lecture.
2. Régler l'écrou ① pour assurer qu'entre les guides et les têtes d'enregistrement et d'effacement, la bande ne se gondole pas. Voir Fig. 12-4.
3. Faire marcher en direction opposée.
4. Régler l'écrou ② pour assurer qu'entre les guides et la tête d'enregistrement et la tête factice, la bande ne se gondole pas.
5. Vérifier qu'il n'y a pas de gauchissement de la bande en répétant plusieurs fois le défilement dans les deux sens.

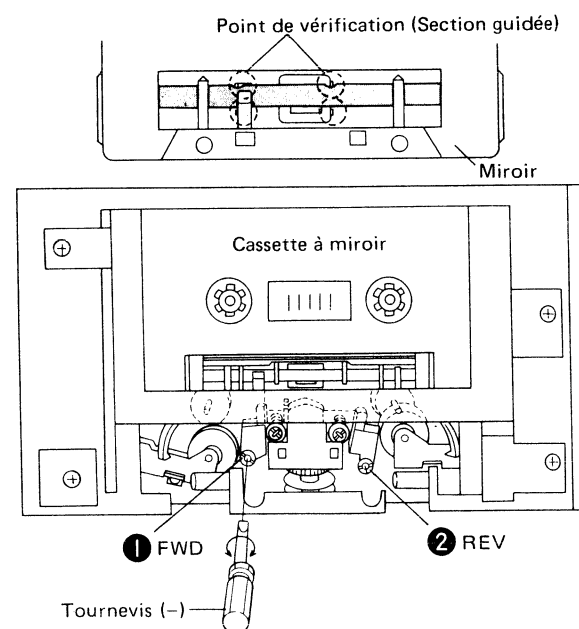


Fig. 12-4 Réglage du défilement de bande

12.1.4 Réglage de la vitesse de rotation rapide de déroulement de d'enroulement

1. Brancher un mesureur de fréquence entre les bornes FG et GND sur l'ensemble de contrôle du tambour de moteur. Voir Fig. 12-5.
2. Mettre en marche vers l'avant et commuter en mode de déroulement rapide.
3. Régler la lecture du mesureur à $72\text{Hz} \pm 2\text{Hz}$ au moyen de VR202.
4. Commuter en mode d'enroulement et vérifier que la lecture du mesureur se trouve proche de $72\text{Hz} \pm 5\text{Hz}$.

Moteur d'entraînement du mécanisme de bobinage

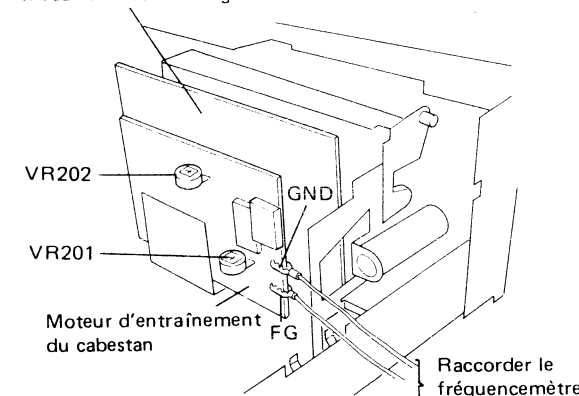


Fig. 12-5 Réglage de la vitesse de rotation rapide de déroulement de d'enroulement

12.1.5 Réglage du couple de torsion à l'enroulement en mode de lecture

1. Mettre en marche en direction avant, insérer une cassette mesureur de couple de tension et commuter en mode de lecture.
2. Régler le couple de torsion d'enroulement à $45\text{g}\cdot\text{cm} \pm 5\text{g}\cdot\text{cm}$ au moyen de VR201.
3. Faire marcher en direction opposée.
4. Vérifier que le couple de torsion d'enroulement est de $45\text{g}\cdot\text{cm} \pm 10\text{g}\cdot\text{cm}$.

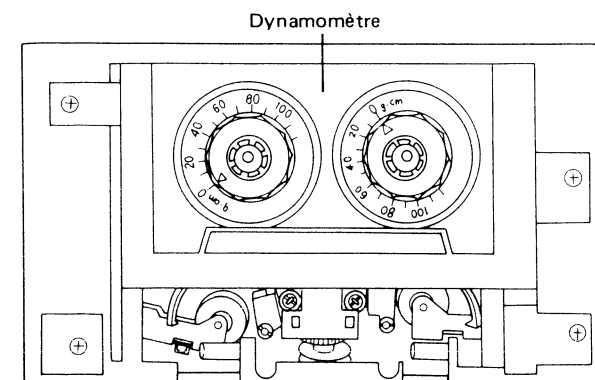


Fig. 12-6 Réglage du couple de torsion à l'enroulement en mode de lecture

12.1.6 Réglage de la vitesse de défilement de la bande

1. Brancher le mesureur de fréquence sur les bornes de sortie.
2. Faire marcher en direction avant, insérer une bande d'essai STD-301 enroulée à son début et commuter en mode de lecture.
3. Régler la lecture du mesureur de fréquence à $3005\text{Hz} \pm 10\text{Hz}$ au moyen du VR101.
4. Faire marcher en direction opposée, enrouler la bande à son commencement, puis commuter en mode de lecture.
5. Vérifier que la lecture du mesureur de fréquence est proche de $3005\text{Hz} \pm 20\text{Hz}$.

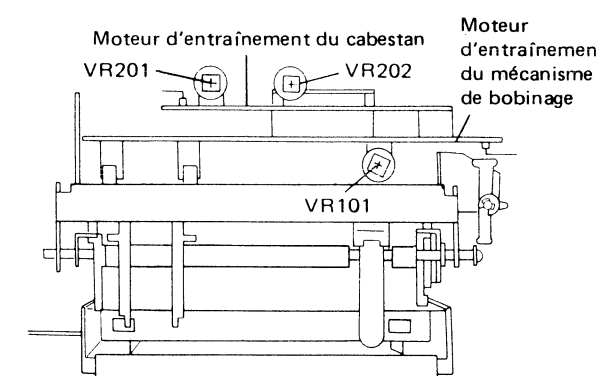


Fig. 12-7 Réglage de la vitesse de défilement de la bande

12.1.7 Vérification du couple de torsion en défilement rapide

1. Faire marcher en direction avant, insérer une cassette mesureur de couple de torsion, puis commuter en mode de défilement rapide vers l'avant.
2. Vérifier que le couple de torsion de défilement rapide vers l'avant se situe aux environs de $100\text{g}\cdot\text{cm} \pm 30\text{g}\cdot\text{cm}$.
3. Commuter en mode d'enroulement et vérifier que le couple de torsion d'enroulement se situe aux environs de $100\text{g}\cdot\text{cm} \pm 30\text{g}\cdot\text{cm}$.

12.1.8 Vérification du couple de torsion de la contre-tension

1. Faire marcher en direction avant, insérer un mesureur de couple de tension en forme de cassette, et commuter en mode de lecture.
2. Vérifier que la contre-tension se trouve proche de $3,5\text{g}\cdot\text{cm} \pm 1,5\text{g}\cdot\text{cm}$.
3. Faire marcher en direction inverse.
4. Vérifier que la contre-tension de nouveau se trouve proche de $3,5\text{g}\cdot\text{cm} \pm 1,5\text{g}\cdot\text{cm}$.

12.2 RÉGLAGES ÉLECTRIQUES

- Vérifier les points suivants avant de faire aucun réglage électrique.

1. Tous les réglages mécaniques doivent être terminés.
2. Nettoyer les têtes et démagnétiser la tête d'enregistrement/lecture.
3. Les mesures de niveau sont basées sur $0\text{dBv} = 1\text{V}$. Brancher une fausse résistance de $50\text{k}\Omega$ ($47\text{k}\sim 52\text{k}\Omega$) sur les bornes de sortie.
4. Utiliser les bandes d'essai spécifiées pour chaque réglage. Bien que ces bandes aient deux côtés, A et B, utiliser le côté identifié par A.

STD-341A : Réglage de lecture (PLAYBACK)

STD-608A : Bande vierge NORMALE

STD-603 : Bande vierge CrO_2

STD-604 : Bande vierge MÉTAL

5. Préparer les instruments de mesure suivants : Millivoltmètre AC, oscillateur audio, atténuateur et oscilloscope.
6. Sauf indication contraire, régler toujours les canaux droite et gauche.
7. Sauf indication contraire, régler avec le bouton DOLBY NR en position OFF.

8. Laisser chauffer le magnétophone pendant quelques minutes avant de faire un réglage. Également, faire marcher le magnétophone en mode lecture et enregistrement respectivement de 3 à 5 minutes avant d'opérer les réglages de réponse de fréquence de lecture et d'enregistrement.
9. Procéder en suivant la séquence spécifiée de réglage. Un changement dans la séquence peut empêcher un réglage correct d'être fait et peut produire, par la suite, une perte de qualité.

Séquence de réglage

1. Azimuth de têtes
2. Vérification du défilement de bande
3. Equilibrage de reproduction
4. Niveau de lecture
5. Courant d'effacement
6. Réponse de fréquence enregistrement/lecture
7. Niveau d'enregistrement
8. Détection de guidage de bande
9. Vérification d'effet de limiteur

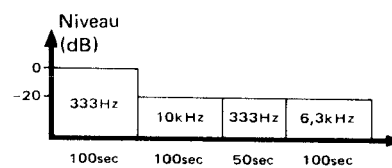


Fig. 12-8 Bande d'essai STD-341A

12.2.1 Réglage de l'azimuth de têtes

Positions

Millivoltmètre AC... Brancher sur les bornes de sortie

Bande d'essai STD-341A (10kHz, -20dB)

Commutateur de direction Vers l'avant

Mode Lecture

VR503 et VR504 ... Tourner vers la droite pour position maximum

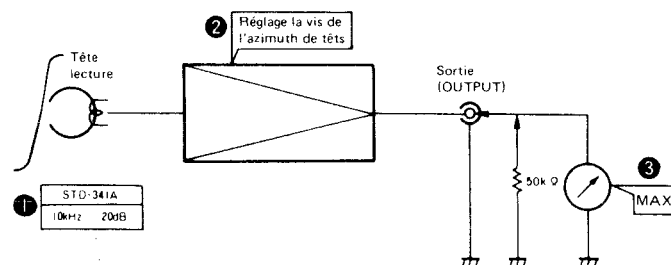


Fig. 12-9 Réglage de l'azimuth de têtes

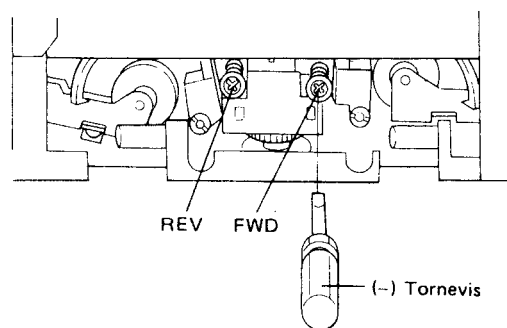


Fig. 12-10 Réglage de l'azimuth de têtes

Marche à suivre

1. Tourner la vis de réglage de l'azimuth vers l'avant pour obtenir une indication maximum du millivoltmètre AC.
2. Changer de direction et tourner la vis de réglage de l'azimuth pour la direction opposée afin d'obtenir une indication maximum du millivoltmètre AC.

3. Reprendre la direction vers l'avant et vérifier qu'il n'y a aucun changement dans le réglage de l'azimuth. Dans le cas de différence notable, refaire le réglage en suivant 1 et 2. (Bloquer les vis avec un vernis de blocage une fois le réglage terminé.)

12.2.2 Vérification de défilement de bande

Disposition

Bande d'essai Demi-cassette équipée d'un miroir

Commutateur de direction Vers l'avant
Mode Lecture

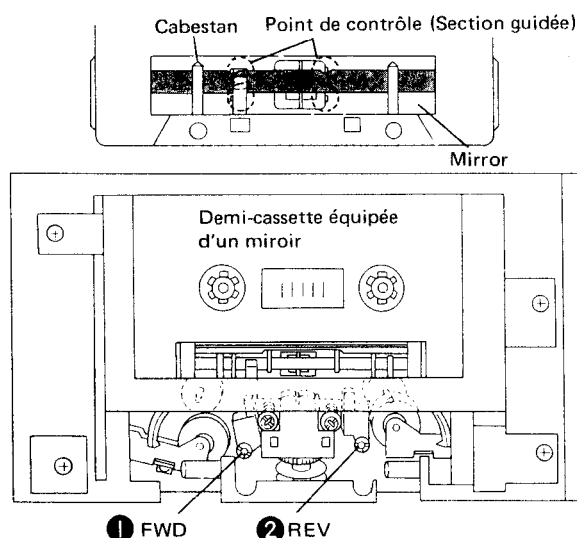


Fig. 12-11 Vérification du défilement de bande

Marche à suivre

1. Vérifier que la bande ne se gondole pas dans la section guidée entre les têtes d'enregistrement et d'effacement.
2. Renverser la direction du défilement de la bande et vérifier que la bande ne se gondole pas dans la section guidée entre la tête d'enregistrement et la tête factice.
3. S'il y a gondolement de la bande, régler le défilement ainsi qu'il est décrit dans la section 12.1.3, page 50, et répéter la marche à suivre de réglage de la section 12.2.1.

12.2.3 Réglage d'équilibrage de reproduction

Positions

Millivoltmètre AC ... Brancher les sur bornes de sortie

Bande d'essai STD-341A (333Hz, -20dB)
(6,3kHz, -20dB)

Commutateur de direction Vers l'avant
Mode Lecture

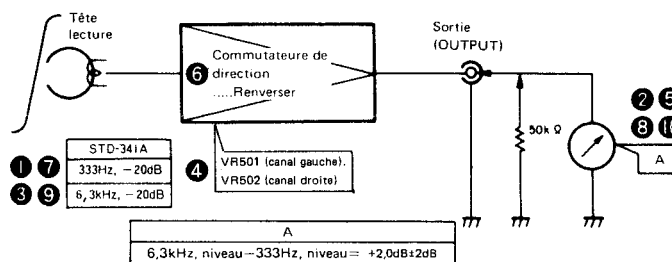


Fig. 12-12 Vérification du filtre de lecture

Marche à suivre

1. Faire marcher la portion de 333Hz, -20dB et enregistrer les lectures du millivoltmètre AC.
2. Puis, faire passer la portion de 6,3kHz, -20dB et régler VR501 (canal gauche) et VR502 (canal droite) de telle sorte que la différence du signal de sortie de reproduction est au niveau de 333Hz puisque le niveau de référence est +2,6dB.
3. Renverser la direction et lire la bande d'essai à nouveau comme il est décrit en 1 et 2, vérifier que la différence de sortie n'est pas au-delà de +2,0dB±2dB.

12.2.4 Réglage du niveau de lecture

Comme ce réglage détermine le niveau du DOLBY NR pendant la lecture, il doit être fait avec précision.

Positions

Millivoltmètre AC ... Brancher sur TP (DOL gauche) et TP (DOL droite)

Bande d'essai STD-341A (333Hz, 0dB)

Commutateur de direction Vers l'avant
Mode Lecture

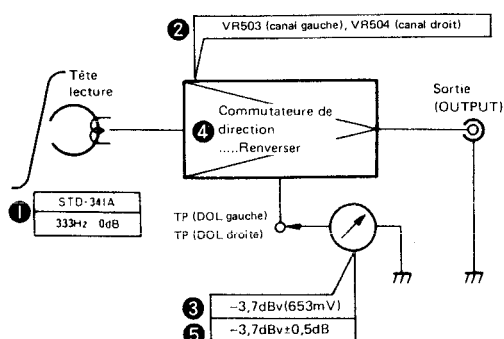


Fig. 12-13 Réglage du niveau de lecture

Marche à suivre

1. Régler VR503 (canal gauche) et VR504 (canal droit) de telle sorte que le mesureur indique $-3,7\text{dBv}$ (653mV).
2. Mettre en direction inverse et vérifier que le millivoltmètre AC indique une position proche de $-3,7\text{dBv} \pm 0,5\text{dB}$.
3. Si l'indication n'est pas dans les limites spécifiées, vérifier le passage de la bande et recommencer le réglage à partir de 1.

12.2.5 Réglage du courant d'effacement**Dispositions**

Millivoltmètre AC	Branché sur TP (IE)
Bande d'essai	STD-604
Contrôle de volume d'entrée	Niveau Minimum
VR303 et VR403	Positions centrales
Commutateur de direction	Vers l'avant
Mode	Enregistrement

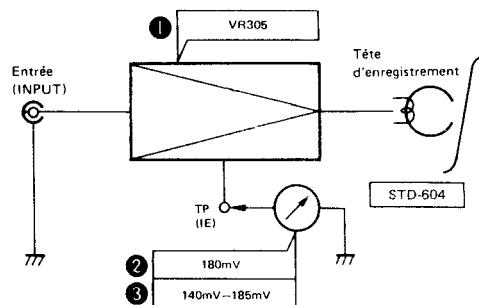


Fig. 12-14 Réglage du courant d'effacement

Marche à suivre

1. Régler VR305 pour obtenir une lecture de 180mV sur le millivoltmètre AC.
2. Changer de direction et vérifier que la lecture du millivoltmètre alternatif se trouve entre 140mV et 185mV .
3. Si l'indication n'est pas dans les limites spécifiées, régler le VR305 de façon à ce que l'indication dans les deux directions soit gardée entre la limite $140\text{mV} \sim 185\text{mV}$.

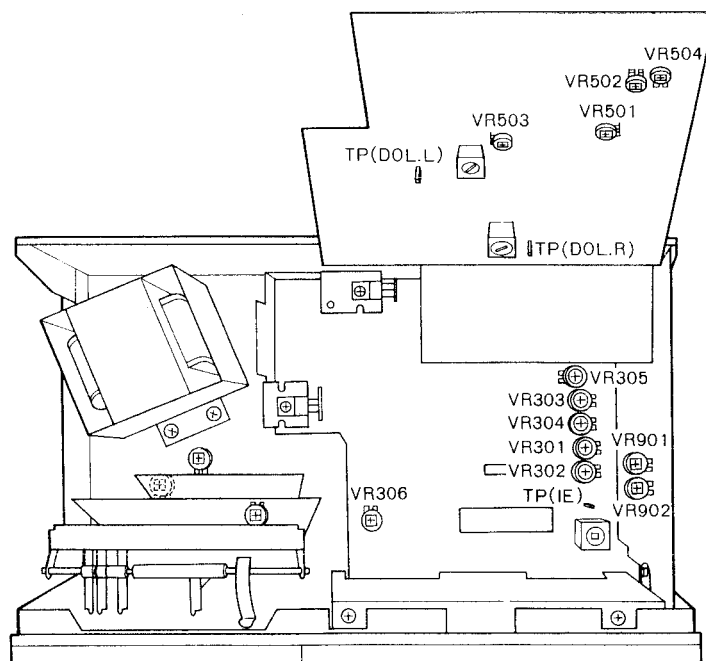


Fig. 12-15 Point de réglage

12.2.6 Réglage de réponse de fréquence enregistrement/lecture

Positions

Millivoltmètre AC... Brancher sur les bornes de sortie

Signal d'entrée 333Hz, -30dBv (31,6mV) aux bornes de LINE INPUT

Bande d'essai STD-608A (STD-603, STD-604)

Commutateur de direction Vers l'avant

Mode Enregistrement

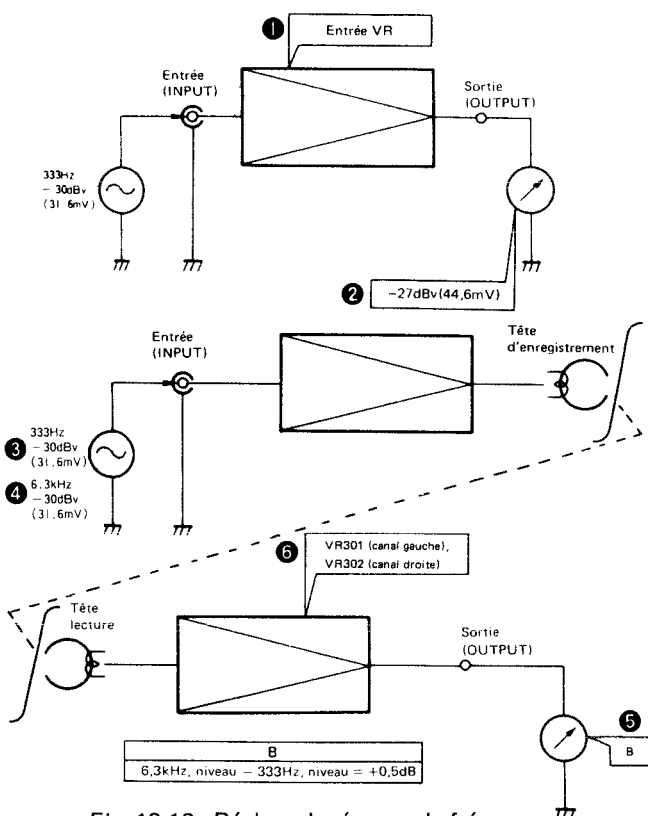


Fig. 12-16 Réglage de réponse de fréquence enregistrement/lecture

Marche à suivre

1. Ajuster le contrôle de niveau d'entrée de telle sorte que le mesureur indique -27dBv (44,6 mV).
2. Enregistrer les signaux de 333Hz, -30dBv et 6,3kHz, -30dBv et ajuster le VR301 (canal gauche) et le VR302 (canal droit) de telle sorte que la différence du niveau du signal de sortie avec le niveau de 333Hz pris comme référence est de +0,5dB.
3. Changer la position du commutateur de DOLBY NR (Voir Figs. 12-17 et 12-18) et vérifier que la réponse à la fréquence est satisfaisante.

4. De même, régler VR303 (canal gauche) et VR304 (canal droit) dans la direction opposée.
5. Si la réponse de reproduction ne correspond pas aux spécifications, régler VR305 à la condition que la borne TP (IE) se trouve entre 140mV et 185mV, puis répéter ce réglage à partir du point 1.

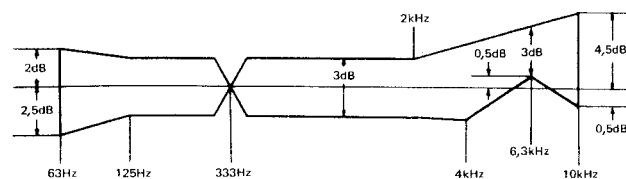
Réponse de fréquence de lecture

Bande d'essai STD-341A

Commutateur de DOLBY NR OFF

REMARQUE:

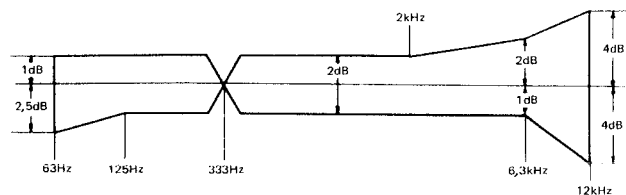
En raison d'un effet d'émoussement, compenser le canal droit par -0,5dB à 125Hz et -1dB à 63Hz.



Réponse générale à la fréquence

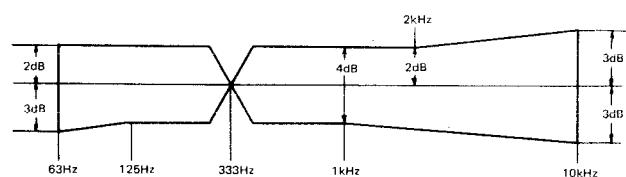
Bande d'essai STD-608A

Commutateur de DOLBY NR OFF



Bande d'essai STD-608A

Commutateur de DOLBY NR ON (Type B)



Bande d'essai STD-608A

Commutateur de DOLBY NR ON (Type C)

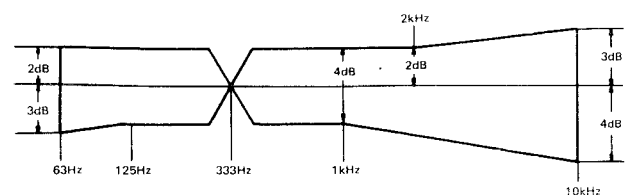
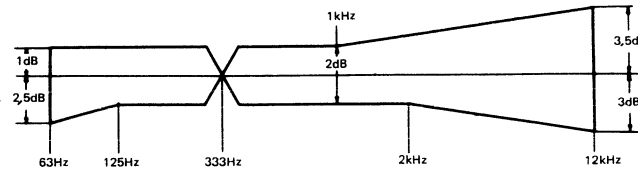
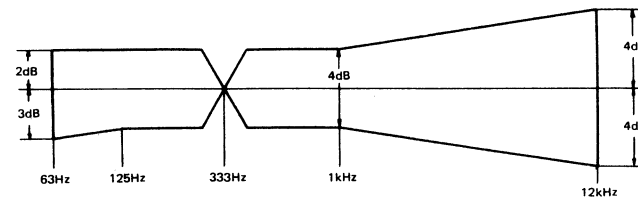


Fig. 12-17 Réponse à la fréquence

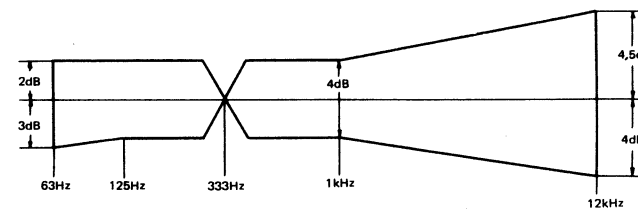
Bande d'essai STD-603
Commutateur de DOLBY NR OFF



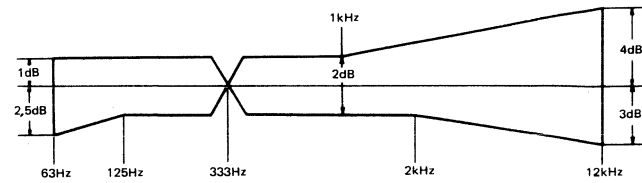
Bande d'essai STD-603
Commutateur de DOLBY NR ON (Type B)



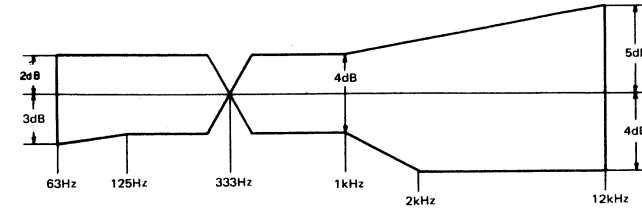
Bande d'essai STD-603
Commutateur de DOLBY NR ON (Type C)



Bande d'essai STD-604
Commutateur de DOLBY NR OFF



Bande d'essai STD-604
Commutateur de DOLBY NR ON (Type B)



Bande d'essai STD-604
Commutateur de DOLBY NR ON (Type C)

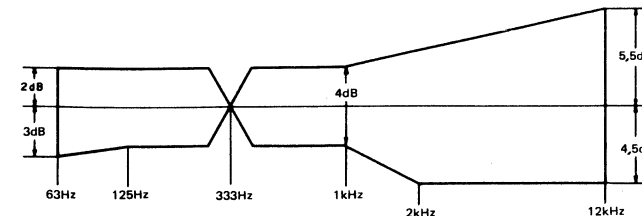


Fig. 12-18 Réponse à la fréquence

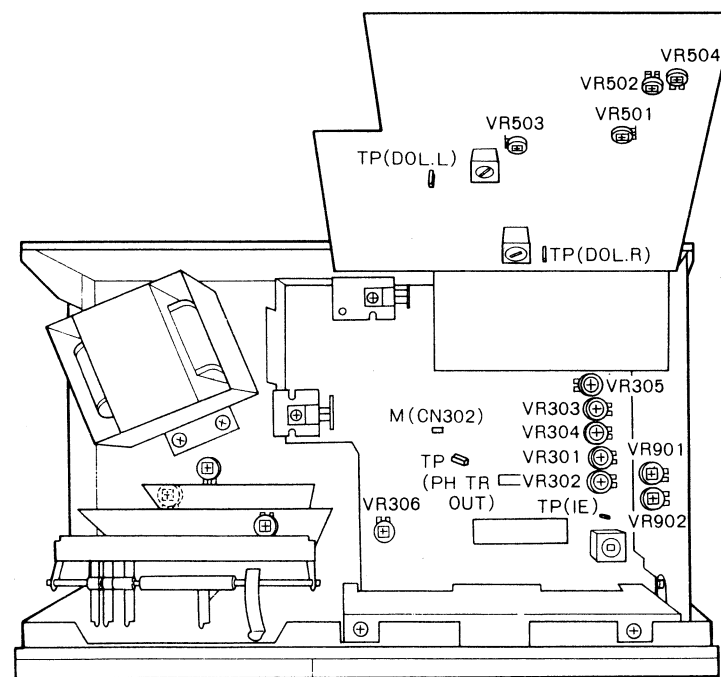


Fig. 12-19 Point de réglage

12.2.7 Réglage du niveau d'enregistrement

Positions

Millivoltmètre AC ... Brancher sur TP (DOL gauche) et TP (DOL droite)
Signal d'entrée 333Hz, -10dBv (316mV) sur bornes LINE INPUT
Bande d'essai STD-608A (STD-603, STD-604)
Sélecteur de bande .. NORM (CrO₂, METAL)
Mode Enregistrement

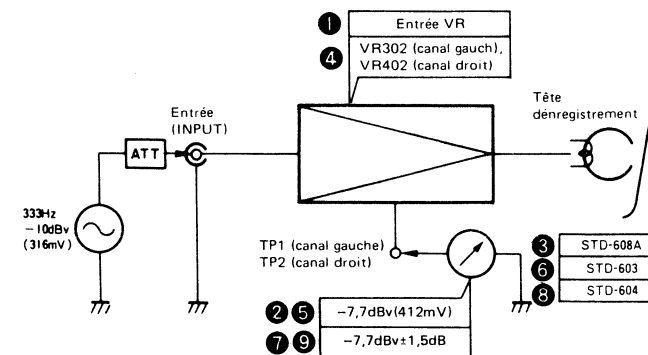


Fig. 12-20 Réglage du niveau d'enregistrement

Marche à suivre

1. Ajuster le contrôle de niveau d'entrée de telle sorte que le mesureur indique -7,7dBv (412 mV).
2. Positionner le commutateur de DOLBY NR B sur la position ON.
3. Enregistrer le signal de 333Hz, -10dBv sur la bande STD-608A. Puis ajuster VR901 (canal gauche) et VR902 (canal droit) de telle sorte que le mesureur indique -7,7dBv (412mV) quand le signal enregistré est passé en lecture.
4. Répéter le point 3 en se servant de la bande d'essai STD-603. Le niveau de sortie de reproduction devrait se trouver entre -7,7dBv et $\pm 1,5$ dB.
5. Recommencer en utilisant la bande d'essai STD-604. Le niveau de sortie de reproduction devrait se trouver entre -7,7dBv $\pm 1,5$ dB.

12.2.8 Réglage de détection de guidage de bande

Réglage 1

Mode Arrêt
Signal d'entrée 2kHz, -17dBv (0.4Vp-p onde sinusoïdale) à la borne TP (PH TR OUT)
Millivoltmètre CC Brancher sur pin 4 de IC306 (PA3010)

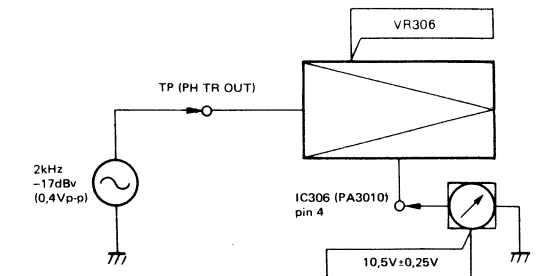


Fig. 12-21 Réglage de la détection d'amorce de bande

Marche à suivre 1

1. Débrancher la connection de CN302 du montage de contrôle.
2. Régler le VR306 de façon à ce que le millivoltmètre CC indique 10,5V $\pm 0,25$ V.
3. Reporter le connecteur CN302 sur sa position originale

Réglage 2

Mode Lecture
Bande Demi-cassette sans bande
Oscilloscope Brancher sur la borne TP (PH TR OUT).

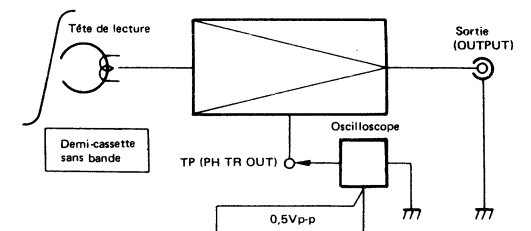


Fig. 12-22 Réglage de la détection d'amorce de bande

Marche à suivre 2

1. Confirmer que la forme ondulatoire est carrée de 0,6Vp-p.
2. En cas de dépassement de 0,6Vp-p, faire un pont de la section A comme il est montré Fig. 12-24.

12.2.9 Vérification d'effet de limiteur

Réglant
Mode Enregistrement
Signal d'entrée 333Hz, 0dBv (1V) sur la borne de LINE INPUT
Bande d'essai STD-608A
Millivoltmètre AC Brancher sur la borne LINE

Commutateur de direction Vers l'avant
Contrôle de niveau d'entrée Position de cliquet

Marche à suivre
Vérifier que le millivoltmètre AC montre -2dBv ±1,5dB.

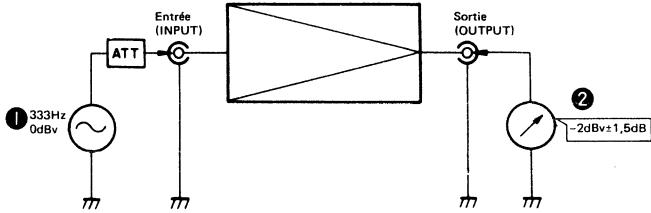


Fig. 12-23 Vérification d'effet de limiteur

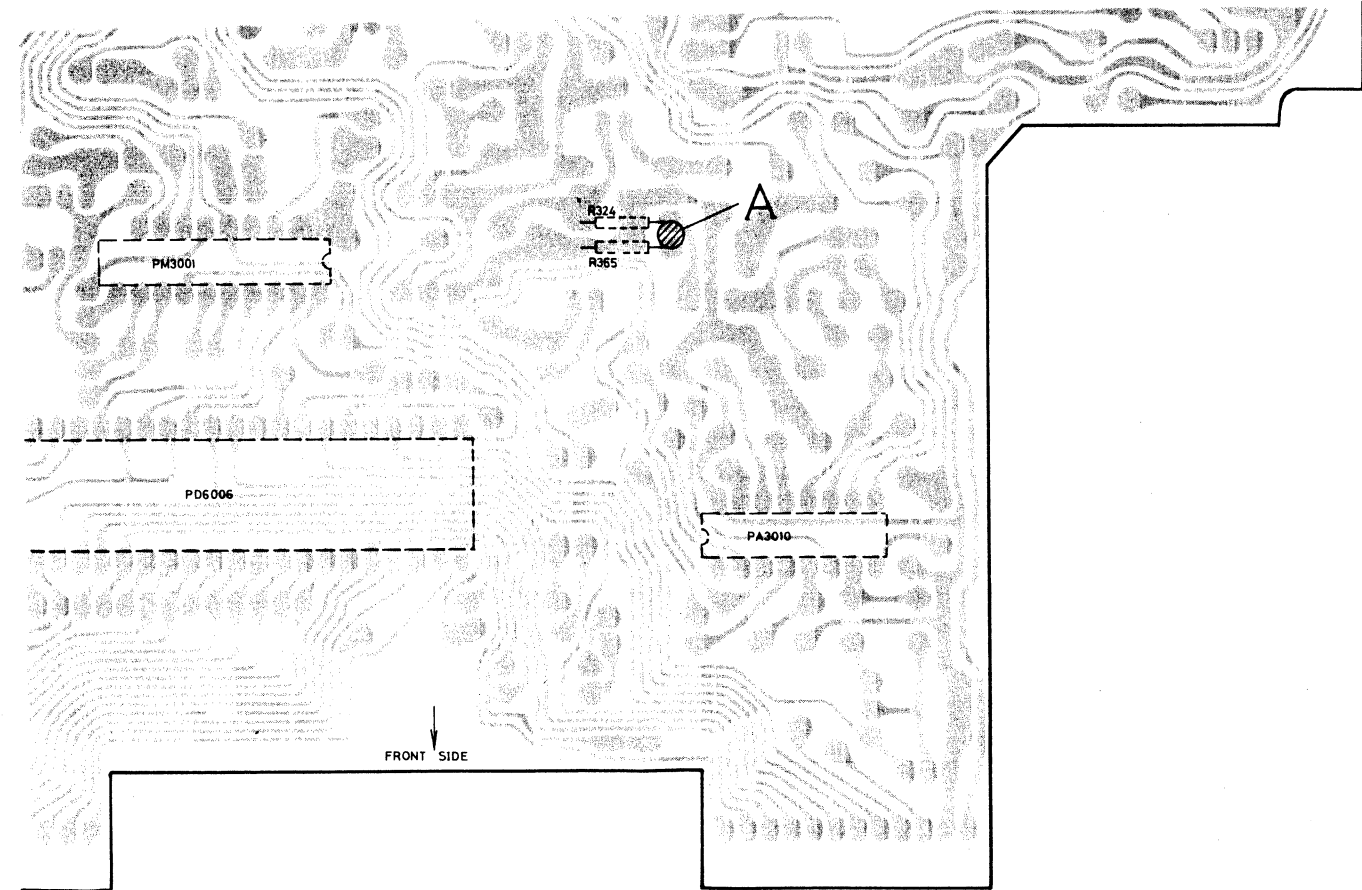


Fig. 12-24 Point de soudage (Montage de contrôle, côté feuille).

12. AJUSTE

12.1 AJUSTES MECÁNICOS

12.1.1 Ajuste del rodillo de presión

1. Ajustar la dirección hacia adelante y cambiar al modo de reproducción sin cargar ningún casete.
2. Empleando un calibrador de tensión, como se muestra en la figura 12-1, presionar con cuidado contra el brazo del rodillo de presión. El calibrador de tensión deberá indicar entre 250 y 400g en el momento en que el rodillo de presión se separe del eje de arrastre y parar a girar el eje de arrastre.
3. Si la indicación cae fuera del margen mencionado, reemplazar el muelle de presión del rodillo.
4. Ajustar la dirección inversa y medir la presión del rodillo de presión del otro lado del mismo modo descrito anteriormente.

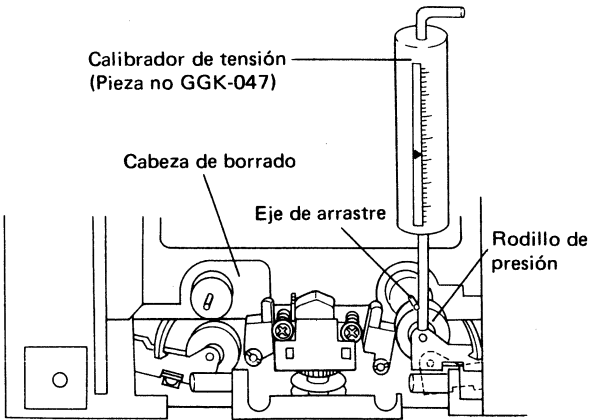


Fig. 12-1 Ajuste del rodillo de presión

12.1.2 Ajuste Preliminar del acimut

1. Ajustar la dirección hacia adelante y establecer el modo de parada.
2. Empleando un destornillador como se muestra en la figura 12-2, ajustar el huelgo entre la envoltura y la base rotativa a 1,5mm girando el tornillo de ajuste ①.
3. Ajustar la dirección inversa.
4. Empleando un destornillador de nuevo, ajustar el huelgo B entre la envoltura y la base rotativa a 1,5mm girando el tornillo ②.

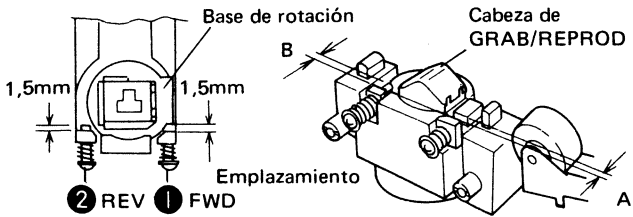


Fig. 12-2 Ajuste preliminar del acimut

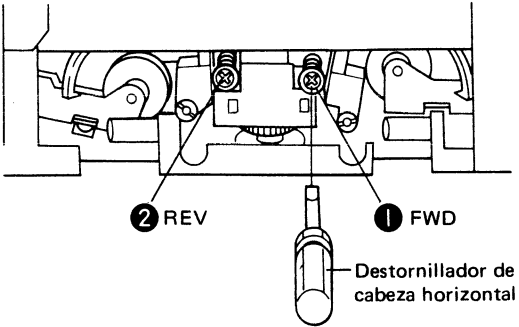


Fig. 12-3 Preajuste del acimut

12.1.3 Ajuste del transporte de la cinta

1. Ajustar la dirección hacia adelante, cargar el casete con espejo y establecer el modo de reproducción.
2. Ajustar la tuerca ① para asegurarse de que no ocurre enrollamiento de la cinta en la sección guía de las cabezas de grabación y de borrado como se muestra en la figura 12-4.
3. Ajustar la dirección inversa.
4. Ajustar la tuercas ② para asegurarse de que no ocurre enrollamiento de la cinta en la sección de las cabezas de grabación y ficticia.
5. Comprobar que no se enrolla la cinta durante el transporte de la cinta repetido hacia adelante y hacia atrás.

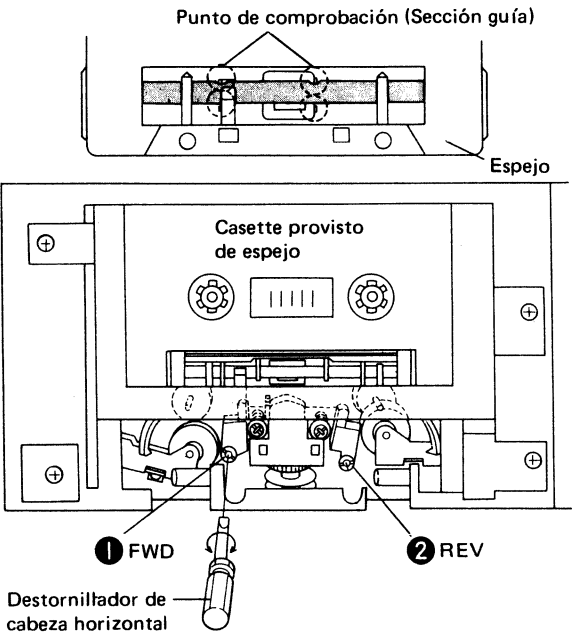


Fig. 12-4 Ajuste del transporte de la cinta

12.1.4 Ajuste de la velocidad de rotación de avance rápido y de rebobinado

1. Conectar un frecuencímetro entre el FG y los terminales de GND del ensamble de control del motor de los carretes (ver la figura 12-5).
2. Ajustar la dirección hacia adelante y establecer el modo de avance rápido.
3. Ajustar la indicación del frecuencímetro a $72 \text{ Hz} \pm 2 \text{ Hz}$ con el VR202.
4. Establecer el modo de rebobinado y comprobar que la indicación del frecuencímetro cae en el margen de $72 \text{ Hz} \pm 5 \text{ Hz}$.

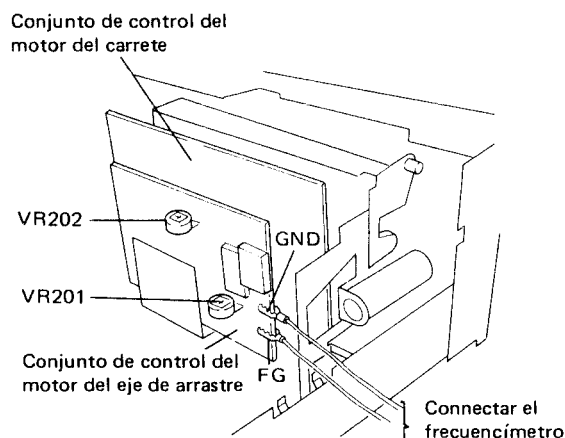


Fig. 12-5 Ajuste de la velocidad de rotación de avance rápido y de rebobinado

12.1.5 Ajuste del par motor de bobinado en el modo de reproducción

1. Ajustar la dirección hacia adelante, cargar un medidor de par motor tipo casete y establecer el modo de reproducción.
2. Ajustar el par motor de bobinado a $45 \text{ g-cm} \pm 5 \text{ g-cm}$ con el VR201.
3. Ajustar la dirección inversa.
4. Comprobar que el par motor de bobinado sea de $45 \text{ g-cm} \pm 10 \text{ g-cm}$.

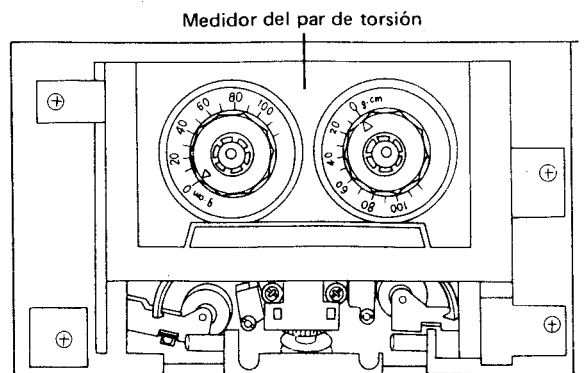


Fig. 12-6 Ajuste del par motor de bobinado en el modo de reproducción

12.1.6 Ajuste de la velocidad de la cinta

1. Conectar un frecuencímetro a los terminales OUTPUT.
2. Ajustar la dirección hacia adelante, cargar una cinta de prueba STD-301, bobinar la cinta hasta el principio y establecer el modo de reproducción.
3. Ajustar la indicación del frecuencímetro a $3005 \text{ Hz} \pm 10 \text{ Hz}$ con el VR101.
4. Ajustar la dirección inversa, bobinar la cinta de prueba hasta el principio y establecer el modo de reproducción.
5. Comprobar que el frecuencímetro indique dentro del margen de $3005 \text{ Hz} \pm 20 \text{ Hz}$.

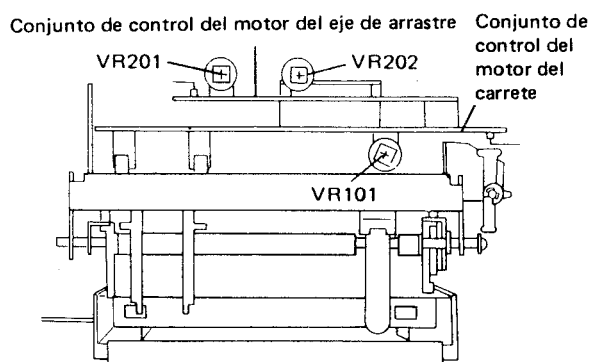


Fig. 12-7 Ajuste de la velocidad de la cinta

12.1.7 Comprobación del par motor de desplazamiento rápido de la cinta

1. Ajustar la dirección hacia adelante, cargar un medidor de par motor tipo casete y establecer el modo de avance rápido.
2. Comprobar que el par motor de avance rápido esté dentro del margen de $100 \text{ g-cm} \pm 30 \text{ g-cm}$.
3. Establecer el modo de rebobinado, y comprobar de nuevo que el par motor de rebobinado esté dentro del margen de $100 \text{ g-cm} \pm 30 \text{ g-cm}$.

12.1.8 Comprobación del par motor de retrotensión

1. Ajustar la dirección hacia adelante, cargar un medidor de par motor tipo casete y establecer el modo de reproducción.
2. Comprobar que la retrotensión del carrete de suministro esté dentro del margen de $3,5 \text{ g-cm} \pm 1,5 \text{ g-cm}$.
3. Invertir la dirección.
4. Comprobar de nuevo que la retrotensión del carrete de suministro esté dentro del margen de $3,5 \text{ g-cm} \pm 1,5 \text{ g-cm}$.

12.2 AJUSTES ELÉCTRICOS

- Comprobar los puntos siguientes antes de empezar los ajustes eléctricos.

1. Deben estar terminados todos los ajustes mecánicos.
2. Limpiar las cabezas y desmagnetizar la cabeza de grabación/reproducción.
3. Las mediciones de nivel se basan en $0\text{dBv} = 1\text{V}$. Conectar un resistor ficticio de 50K ohmios ($47\text{K} \sim 52\text{K}$ ohmios) entre los terminales de salida (OUTPUT).
4. Emplear las cintas de pruebas especificadas para cada ajuste. Aunque las cintas de pruebas tienen los lados A y B, utilizar el lado de la etiqueta (lado A).
 STD-341 : Ajustes de la reproducción
 STD-608A : Cinta en blanco NORMAL
 STD-603 : Cinta en blanco de CrO_2
 STD-604 : Cinta en blanco de METAL
5. Preparar el siguiente equipo de medición: Un milivoltímetro de CA, oscilador de audio, atenuador, y un osciloscopio.
6. A menos que se especifique lo contrario, ajustar siempre los canales izquierdo y derecho.
7. A menos que se especifique lo contrario, efectuar el ajuste con el interruptor DOLBY NR en la posición OFF.

8. Dejar precalentar el magnetófono durante algunos minutos antes de iniciar los ajustes. Dejar también el magnetófono en los modos de reproducción y de grabación, respectivamente, durante 3 a 5 minutos antes de iniciar los ajustes de la respuesta en frecuencia de reproducción y de grabación.
9. Proceder de acuerdo con la secuencia de ajuste especificada. Si se cambia la secuencia se puede ocasionar el ajuste incorrecto, dando como resultado en una pérdida del rendimiento.

Secuencia de ajuste

1. Acimut de la cabeza
2. Comprobación del transporte de la cinta
3. Ecualización de reproducción
4. Nivel de reproducción
5. Corriente de borrado
6. Respuesta en frecuencia de grabación/reproducción
7. Nivel de grabación
8. Detección de la parte de cinta guía
9. Comprobación del efecto del limitador

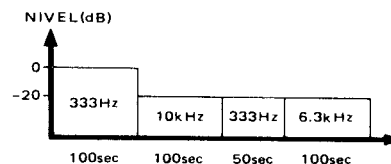


Fig. 12-8 Cinta de prueba STD-341A

12.2.1 Ajuste del acimut de la cabeza

Ajustes

Milivoltímetro de CA ... Conectar a los terminales OUTPUT
 Cinta de prueba STD-341A (10kHz, -20dB)

Interruptor de dirección

..... Hacia adelante
 Modo Reproducción
 VR301 y VR504 Girar hacia la derecha a la posición máxima

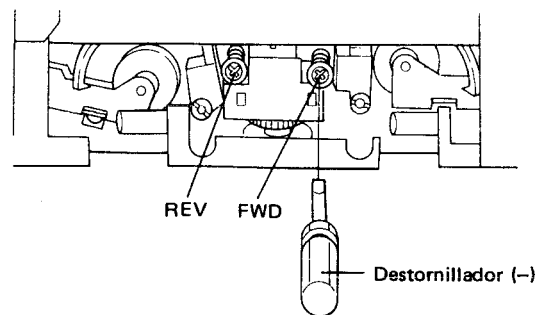


Fig. 12-10 Ajuste del acimut de la cabeza

Procedimiento

1. Girar el tornillo de ajuste del acimut de la cabeza en la dirección hacia adelante para obtener la indicación máxima en el voltímetro de CA.
2. Invertir la dirección y girar el tornillo de ajuste del acimut de la cabeza en la dirección inversa para obtener de nuevo la indicación máxima en el voltímetro de CA.

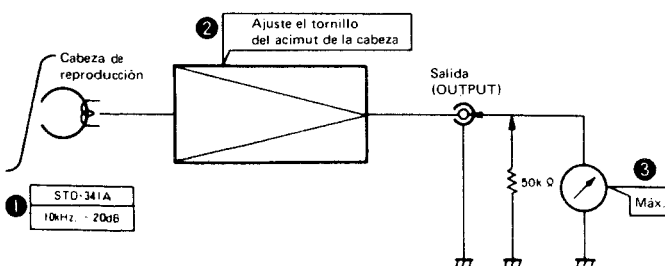


Fig. 12-9 Ajuste del acimut de la cabeza

3. Volver a la dirección hacia adelante y comprobar si no ha habido cambio en el ajuste del acimut. Si ha ocurrido un cambio considerable, reajustar repitiendo los pasos 1 y 2. (Enclavar los tornillos con el enclavador de tornillos después de haber completado el ajuste.)

12.2.2 Comprobación del transporte de la cinta

Ajuste

Cinta de prueba Casete provisto de espejo

Interruptor de

dirección Hacia adelante

Modo Reproducción

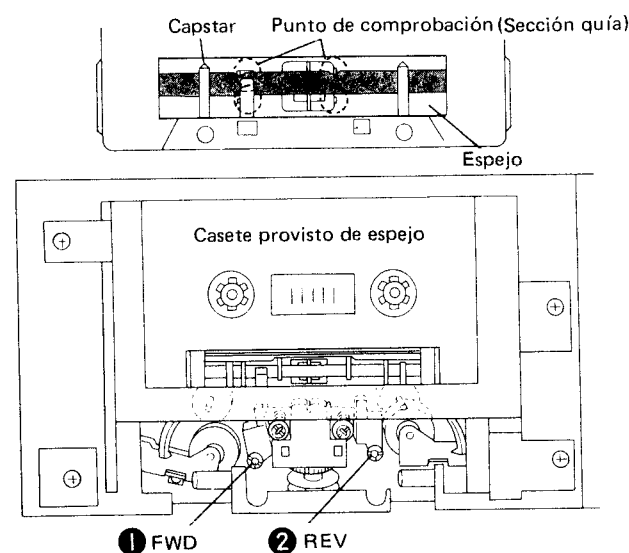


Fig. 12-11 Comprobación del transporte de la cinta

Procedimiento

1. Compruebe que no se enrolle la cinta en la sección guía entre las cabezas de grabación y de borrado.
2. Invierta la dirección del transporte de la cinta y compruebe que no se enrolle la cinta en la sección guía entre las cabezas de grabación y ficticia.
3. Si se enrolla la cinta, ajustar el transporte de la cinta tal y como se ha descrito en la sección 12.1.3 de la página 50 y repetir los procedimientos de ajuste de la sección 12.2.1.

12.2.3 Ajuste de la ecualización de reproducción

Ajustes

Milivoltímetro de CA ... Conectar a los terminales OUTPUT

Cinta de prueba STD-341A (333Hz, -20dB) (6,3kHz, -20dB)

Interruptor de

dirección Hacia adelante

Modo Reproducción

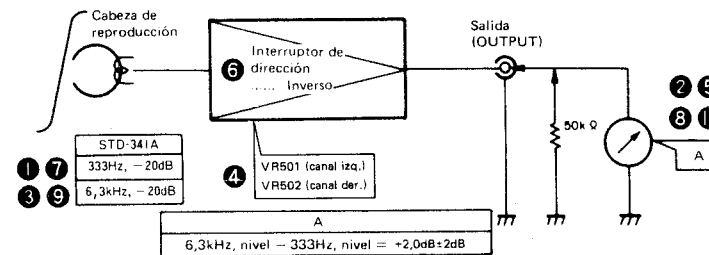


Fig. 12-12 Comprobación de la ecualización de reproducción

Procedimiento

1. Reproducir la parte de 333Hz, -20dB y registrar la indicación del voltímetro de CA.
2. Entonces, reproducir la parte de 6,3kHz, -20dB y ajustar VR501 (canal izq.) y VR502 (canal der.) de modo que la diferencia del nivel de la señal de salida de reproducción con un nivel de 333Hz como nivel de referencia sea de ± 2 dB.
3. Invertir la dirección y reproducir de nuevo la cinta de prueba tal y como se ha descrito en los pasos 1 y 2, comprobando que la diferencia de salida no sea mayor de $\pm 2,0$ dB ± 2 dB.

12.2.4 Ajuste del nivel de reproducción

Puesto que este ajuste determina el nivel de DOLBY NR durante la reproducción, deberá efectuarse con precisión.

Ajustes

Milivoltímetro de CA ... Conectar a TP (DOL izq.) y TP (DOL der.)

Cinta de prueba STD-341A (333Hz, 0dB)

Interruptor de

dirección Hacia adelante

Modo Reproducción

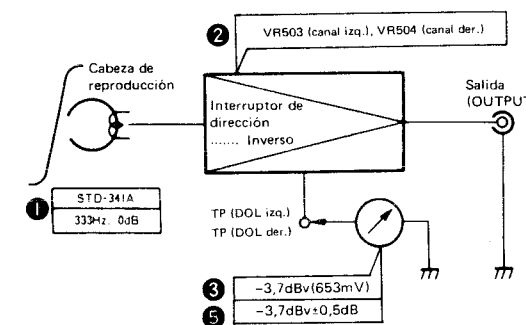


Fig. 12-13 Ajuste del nivel de reproducción

Procedimiento

1. Ajustar VR503 (canal izq.) y VR504 (canal der.) de modo que el voltímetro indique $-3,7$ dBv (653mV).
2. Ajustar la dirección inversa, y comprobar que la indicación del voltímetro de CA esté dentro del margen de $-3,7$ dBv $\pm 0,5$ dB.
3. Si la indicación no cae dentro del margen especificado, comprobar el transporte de la cinta y repetir este ajuste desde el paso 1.

12.2.5 Ajuste de la corriente de borrado

Ajustes

Voltímetro de CA Conectar al TP(IE)

Cinta de prueba STD-604

Control de volumen

INPUT Nivel mínimo

Selector de dirección Avance

Modo Grabación

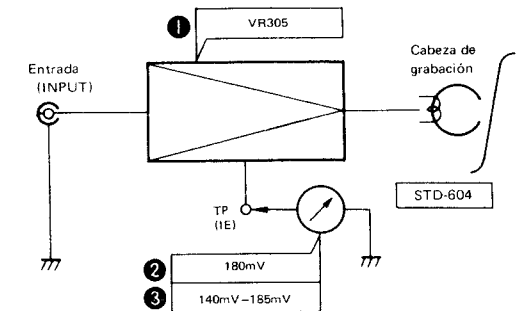


Fig. 12-14 Ajuste de la corriente de borrado

Procedimiento

1. Ajustar el VR305 para obtener una indicación del voltímetro de 180mV en el voltímetro de CA.
2. Invertir la dirección y comprobar que la indicación del voltímetro de CA esté dentro de 140~185mV.
3. Si la indicación no cae dentro del margen especificado, ajustar VR305 a la condición en que la indicación del voltímetro en ambas direcciones esté entre 140mV~185mV.

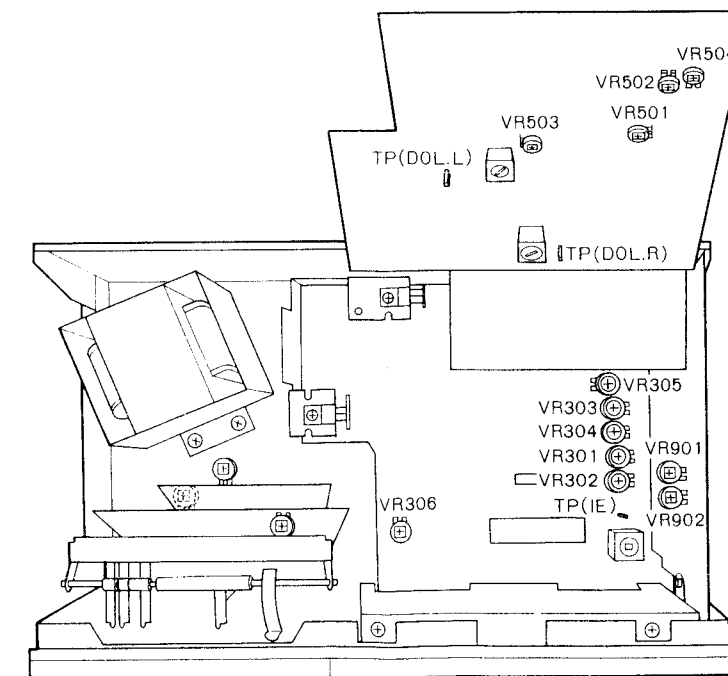


Fig. 12-15 Punto de ajuste

12.2.6 Ajuste de la respuesta en frecuencia de grabación/reproducción

Ajustes

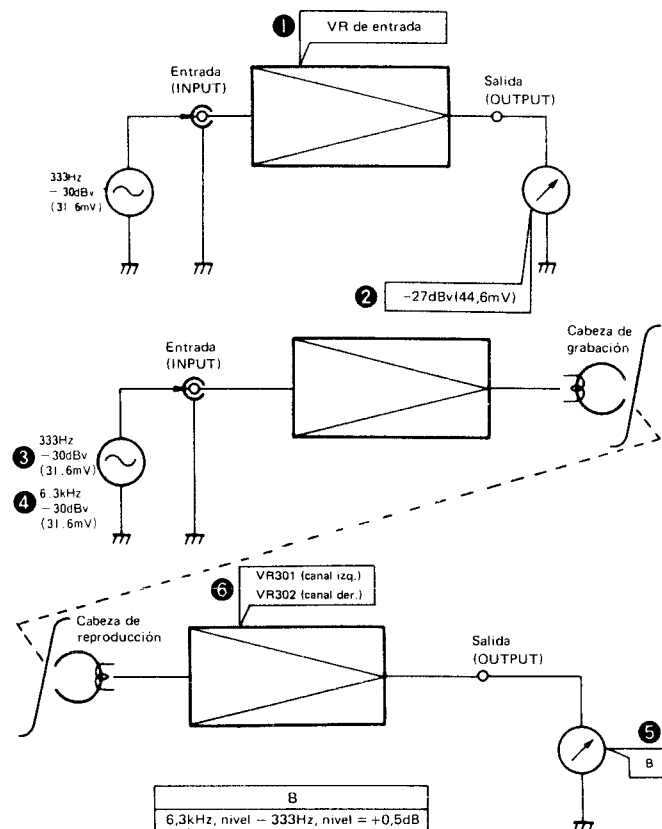
Milivoltímetro de CA .. Conectar a los terminales OUTPUT

Señal de entrada 333Hz, -30dBv (31,6mV) a los terminales LINE INPUT

Cinta de prueba STD-608 (STD-603, STD-604)

Selector de dirección .. Avance

Modo Grabación



Procedimiento

1. Ajustar el control del nivel de entrada (INPUT) de modo que el voltímetro indique -27dBv (44,6mV).
2. Grabar las señales de 333Hz, -30dBv y 6,3kHz, -30dB, y ajustar el VR301 (canal izq.) y VR302 (canal der.) de modo que la diferencia en el nivel de la señal de salida de reproducción con el nivel de 333Hz como nivel de referencia sea +0,5dB.
3. Cambiar la posición del interruptor DOLBY NR (ver la Fig. 12-17 y 18) y comprobar que la respuesta en frecuencia sea satisfactoria.
4. Del mismo modo, ajustar VR303 (canal izq.) y VR304 (canal der.) en la dirección inversa.

5. Si la respuesta de reproducción no satisface las especificaciones, ajustar VR305 con la condición de que el terminal YP (IE) esté dentro del margen de 140~185mV, y repetir este ajuste desde el paso 1.

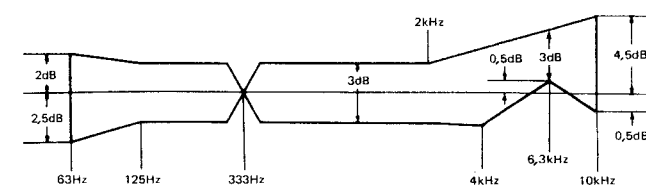
Respuesta en frecuencia de reproducción

Cinta de prueba STD-341A

Interruptor DOLBY NR OFF

NOTA:

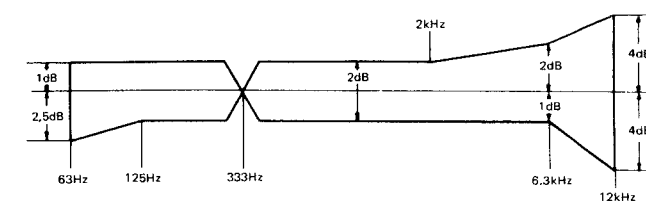
Debido al efecto de borde, compensar el canal derecho en -0,5dB a 125Hz y -1dB a 63Hz.



Respuesta en frecuencia global

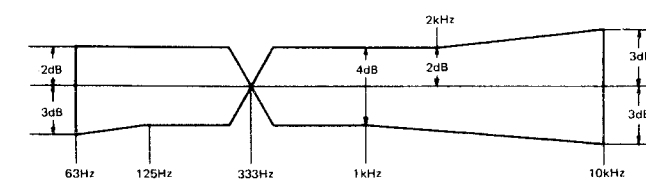
Cinta de prueba STD-608A

Interruptor DOLBY NR OFF



Cinta de prueba STD-608A

Interruptor DOLBY NR ON (Tipo B)



Cinta de prueba STD-608A

Interruptor DOLBY NR ON (Tipo C)

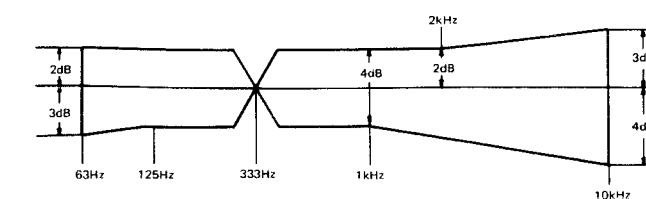
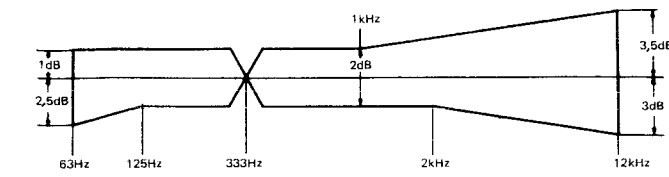


Fig. 12-17 Respuesta en frecuencia

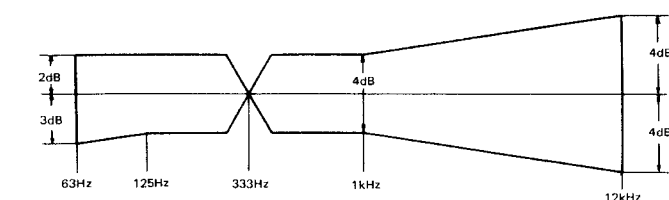
Cinta de prueba STD-603

Interruptor DOLBY NR OFF



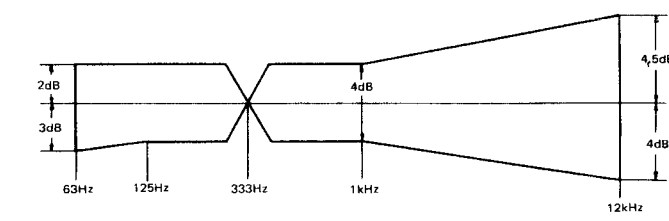
Cinta de prueba STD-603

Interruptor DOLBY NR ON (Tipo B)



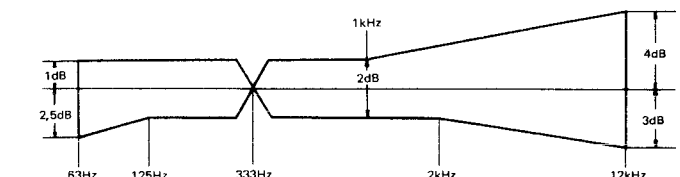
Cinta de prueba STD-603

Interruptor DOLBY NR ON (Tipo C)



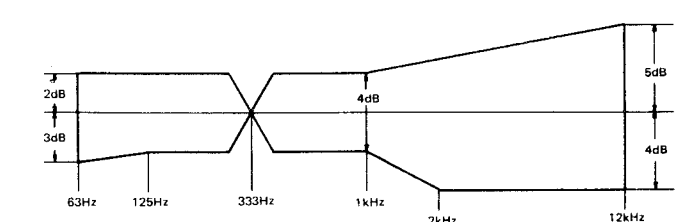
Cinta de prueba STD-604

Interruptor DOLBY NR OFF



Cinta de prueba STD-604

Interruptor DOLBY NR ON (Tipo B)



Cinta de prueba STD-604

Interruptor DOLBY NR ON (Tipo C)

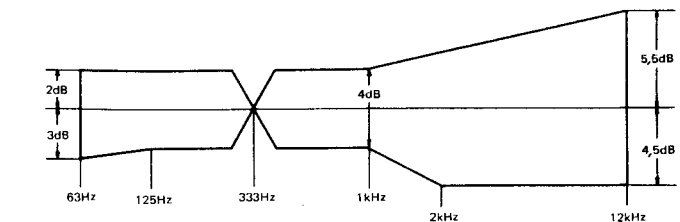


Fig. 12-18 Respuesta en frecuencia

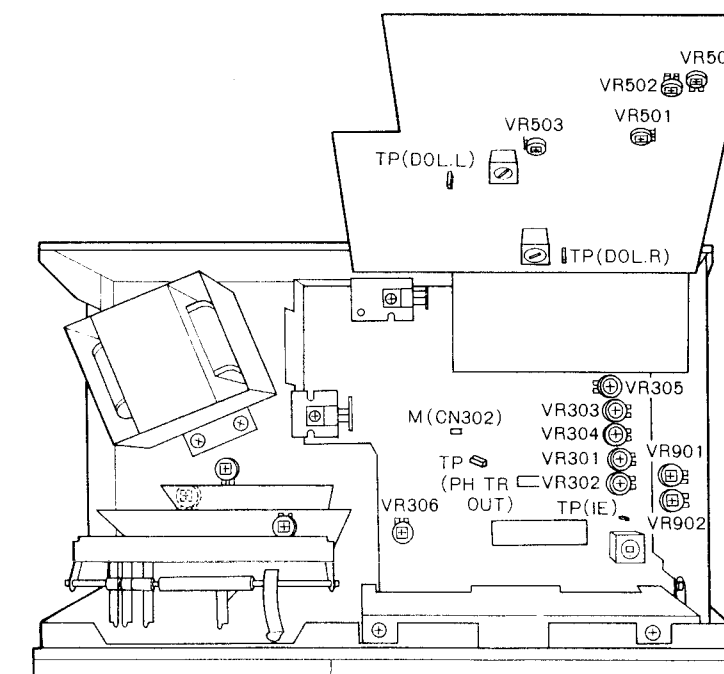


Fig. 12-19 Punto de ajuste

12.2.7 Ajuste del nivel de grabación

Ajustes

Milivoltímetro de CA ... Conectar a TP (DOL. izq.) TP (DOL. der.)
 Señal de entrada 333Hz, -10dBv (316mV) a los terminales LINE INPUT
 Cinta de prueba STD-608A (STD-603, STD-604)
 Modo Grabación

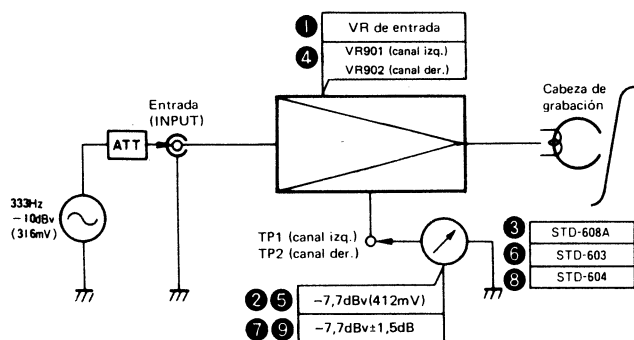


Fig. 12-20 Ajuste del nivel de grabación

Procedimiento

1. Ajustar el control del nivel de entrada (INPUT) de modo que el voltímetro indique -7,7dBv (412mV).
2. Poner el interruptor DOLBY NR B en la posición ON.
3. Grabar la señal de 333Hz, -10dBv en la cinta de prueba STD-608A. Entonces, ajustar el VR901 (canal izq.) y VR902 (canal der.) de modo que el voltímetro indique -7,7dBv (412mV) cuando la señal grabada se reproduzca.
4. Repetir el paso 3 empleando la cinta de prueba STD-603. El nivel de salida de reproducción debe de estar dentro de -7,7dBv ± 1,5dB.
5. Repetir empleando la cinta de prueba STD-604. El nivel de salida de reproducción debe de estar otra vez dentro de -7,7dBv ± 1,5dB.

12.2.8 Ajuste de la detección de cinta guía

Ajustes 1

Modo Parada
 Señal de entrada 2kHz, -17dBv (onda sinusoidal de 0,4Vp-p) al terminal TP (PH TR OUT)
 Voltímetro de CC Conectar a la patilla 4 del IC306 (PA3010)

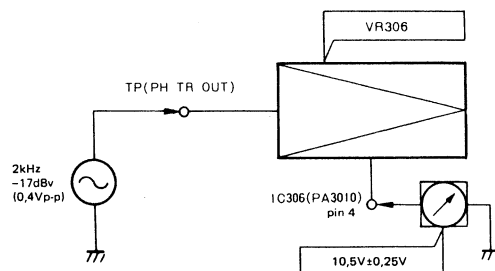


Fig. 12-21 Ajuste de la detección de cinta guía

Procedimiento 1

1. Sacar el conector CN302 del ensamblaje de control.
2. Ajustar el VR306 de modo que el voltímetro de CC indique 10,5V ± 0,25V.
3. Reponer el conector CN302 a la posición original.

Ajustes 2

Modo Reproducción
 Cinta Casete sin cinta
 Osciloscopio Conectar al terminal TP (PH TR OUT)

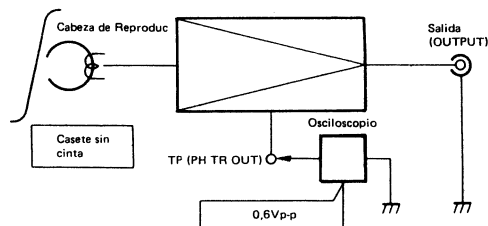


Fig. 12-22 Ajuste de la detección de cinta guía

Procedimiento 2

1. Confirmar que la forma de onda sea una onda cuadrada de 0,6Vp-p.
2. Si se excede de 0,6Vp-p, puentear la sección A mostrada en la Fig. 12-14.

12.2.9 Comprobación del efecto del limitador

Ajuste

Modo Grabación
 Señal de entrada 333Hz, 0dB (1V) al terminal LINE INPUT
 Cinta de prueba STD-608A
 Voltímetro de CA Conectar al terminal LINE OUTPUT
 Selector de dirección .. Avance
 Control del nivel
 INPUT Posición con parada

Procedimiento

Comprobar que la indicación del voltímetro de CA esté entre $-2\text{dBv} \pm 1,5\text{dB}$.

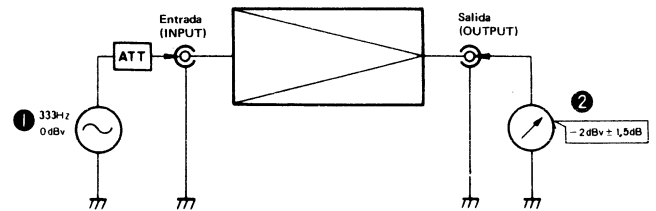


Fig. 12-23 Comprobación del efecto del limitador

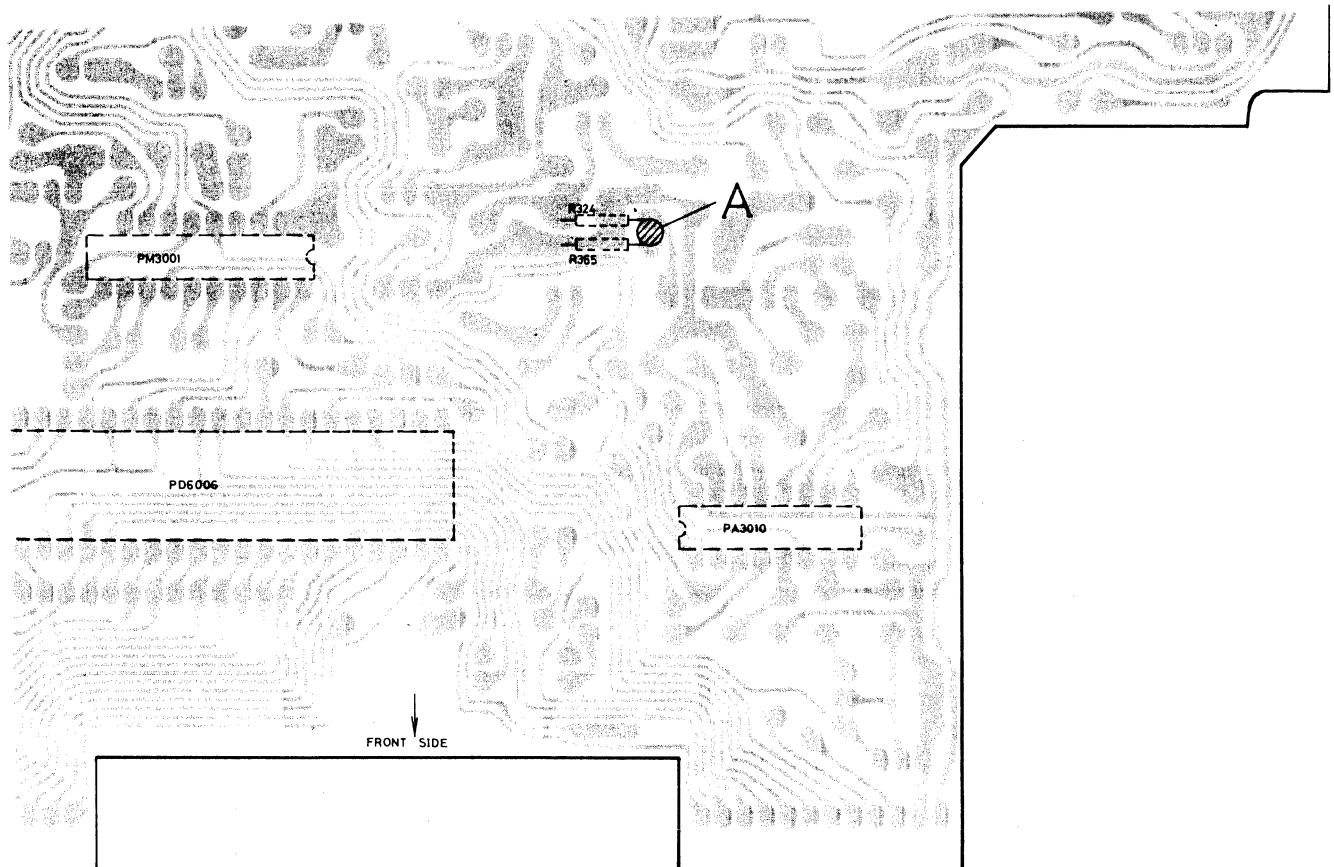


Fig. 12-24 Punto de soldadura (lado de la lámina del ensamblaje de control)

ADDITIONAL



Service Manual

STEREO CASSETTE TAPE DECK

CT-X9

HE, HB, D

This additional service manual is applicable to the HE, HB and D types. Please refer to the KU type service manual (pp.2~76) with the exception of this supplement.

SPECIFICATIONS

Wow and Flutter No more than $\pm 0.16\%$ (DIN)

Miscellaneous

Power Requirements;

HE and HB types AC 220V/240V (switchable)
50/60Hz

D type AC 120V/220V/240V (switchable)
50/60Hz

Power Consumption;

HE and HB types 39W

D type 35W

NOTE:

Reference Tapes: Normal & LH: DIN 45513/BLATT6 or equiv.
CrO₂ DIN 45513/BLATT7 (CrO₂) or equiv.

CONTRAST OF MISCELLANEOUS PARTS

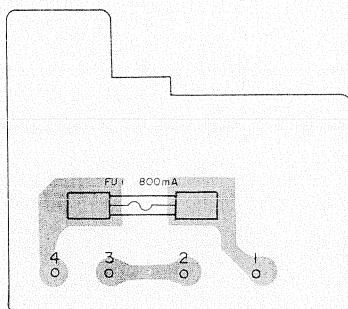
NOTES:

- Parts without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your Parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.
 $\star\star$ GENERALLY MOVES FASTER THAN $\star$.
 This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

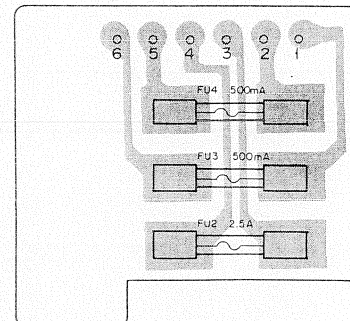
Mark	Symbol & Description	Part No.			
		KU type	HE type	HB type	D type
Δ $\star$	T1 Power transformer (120V) (220V/240V) (120V/220V/240V)	RTT-295	 RTT-296	 RTT-296	 RTT-297
Δ $\star\star$	S1 Line voltage selector	.....	RSX-045	RSX-045	RSX-056
Δ $\star\star$	FU1 Fuse (2.5A) (secondary) Fuse (T800mA) (primary)	REK-068	 REK-064	 REK-064	..... .....
Δ $\star\star$	FU2 Fuse (1A) (Mech. section +B) Fuse (T2.5A) (secondary)	REK-051	 REK-054	 REK-054	..... .....
Δ $\star\star$	FU3, FU4 Fuse (T500mA) (control system)	.....	REK-049	REK-049	.....
Δ	AC power cord	RDG-048	RDG-046	RDG-049	RDG-041
Δ	Strain relief (for AC cord)	REC-395	REC-396	REC-396	REC-395
	Control assembly	RWG-142	RWG-140	RWG-140	RWG-136
	Fuse holder assembly	no supply	.....	.....	.....
	Fuse holder assembly A	.....	no supply	no supply	.....
	Fuse holder assembly B	.....	no supply	no supply	.....
	Bonnet	RNA-596	RNA-591	RNA-591	RNA-591
	Packing case	RHG-563	RHG-561	RHG-561	RHG-562
	Operating instructions (English) (English/German/French/Italian)	RRB-195	 RRE-036	RRB-194	RRB-194
	(Spanish) (Auxiliary)	.....	.....	.....	RRD-061

P.C. BOARD ASSEMBLYS

Fuse Holder Assembly A



Fuse Holder Assembly B



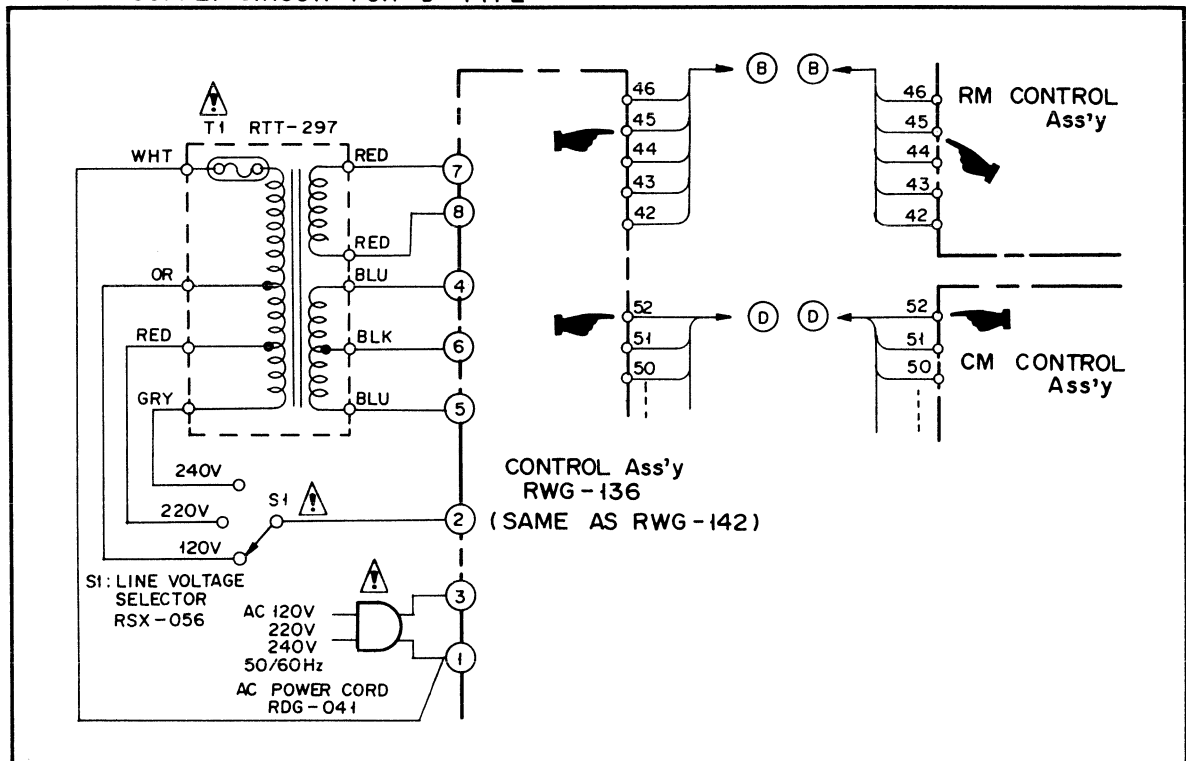
Control Assembly (RWG-140, RWG-136)

- The control assemblies RWG-140 (for HE and HB types) and RWG-136 (for D type) are the same as the RWG-142 (for KU type) with the exception of following table.

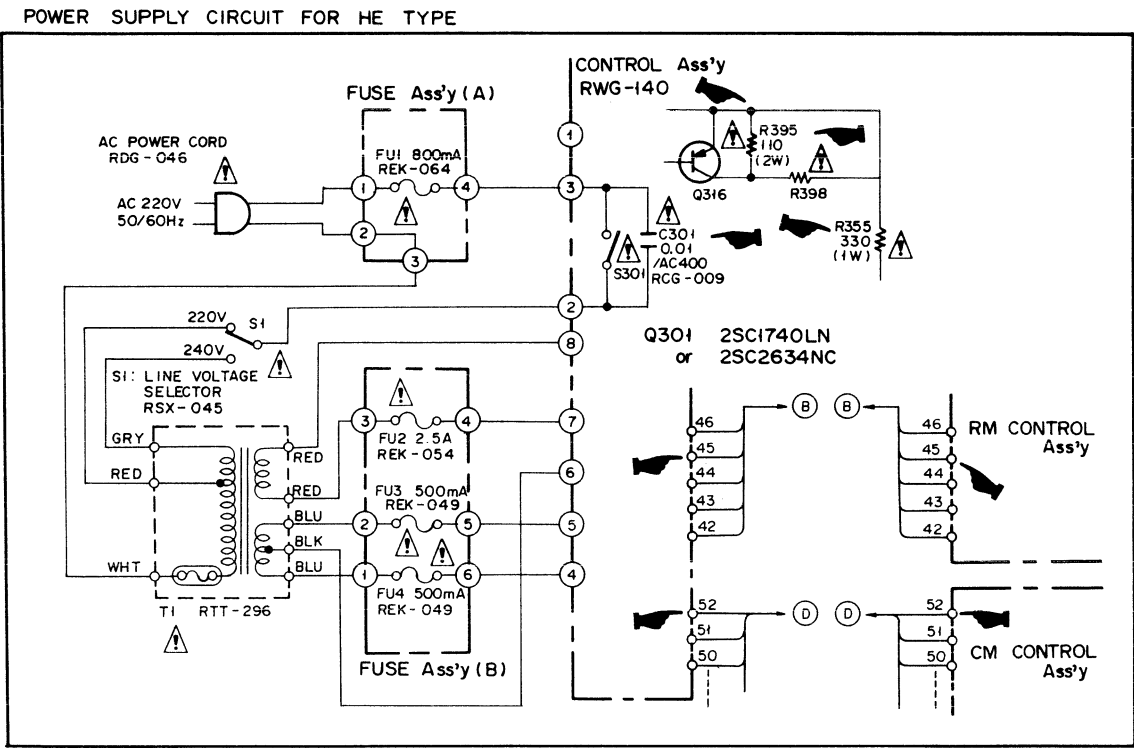
Mark	Symbol & Description	Part No.			Remarks
		RWG-142 (KU)	RWG-140 (HE, HB)	RWG-136 (D)	
⚠	C301 Ceramic capacitor (0.01/AC250V) (0.01/AC400V)	RCG-008	 RCG-009	RCG-008	
⚠	R355 Metal oxide film resistor	RS1LF 101J	RS1LF 331J	RS1LF 101J	
⚠	R395 Metal oxide film resistor	RS2LF 181J	RS2LF 111J	RS2LF 181J	
⚠	R401 Carbon film resistor	RD½PMF 271J	.....	RD½PMF 271J	
	Q301 Transistor	2SC1740LN (2SC1815) (2SC2634NC)	2SC1740LN (2SC2634NC)	2SC1740LN (2SC1815) (2SC2634NC)	
	CN308 Connector assembly 12-P	RKP-681	RKP-646	RKP-646	
	CN309 Connector assembly 5-P	RKP-680	RKP-647	RKP-647	
	C327 Electrolytic (100/35) Electrolytic (100/25)	RCH-051	 CEA 101M 25	 CEA 101M 25	105°C 85°C

SCHEMATIC DIAGRAMS FOR D TYPE

POWER SUPPLY CIRCUIT FOR D TYPE



SCHEMATIC DIAGRAM FOR HE TYPE



SCHEMATIC DIAGRAM FOR HB TYPE

